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By-Impellitteri, Joseph T.

The Development and Evaluation of a Pilot Computer-Assisted Occupational Guidance Program (Project No. 16033, 17033, 18033) Final Report and Appendixes A-E.

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Identifiers-COG Program, *Computer Assisted Occupational Guidance Program

The purpose of this system is three-fold: (1) to provide an easily updated individualized occupational information retrieval system, (2) to develop a process whereby youth can develop an individualized framework of the occupational structures, and (3) to provide an experience fo r youth to acquire operational opportunities by simulated practice. When a student working at a computer terminal requests information on a specific occupation, four operations are activated in the following order: (1) Discrepancies which may exis t between the student's ability-preference profile and the requirements for the particular occupation are typed out, (2) A 2-minute taped interview with a worker in the occupation is played, (3) An image is projected on the slide projector screen depicting the worker undertaking four typical tasks in the occupation, and (4) A 150- to 200-word description of the occupation is typed out for the student to read and to keep for later use. Appendixes include computer printouts of job descriptions for 80 occupations, types of student preference items, and taped interviews with workers. Also included are a bibliography of sources of occupational information, selected dissemination papers, and instruments developed during the course of the project. (CH)

VOCATIONAL EDUCATION DEPARTMENT OF THE PENNSYLVANIA STATE UNIVERSITY

Final Report

THE DEVELOPMENT AND EVALUATION OF A PILOT COMPUTER-ASSISTED OCCUPATIONAL GUIDANCE PROGRAM

(Project No. 16033, 17033, 18033)

(Appendix C: Bibliography of Occupational Information Sources)

Joseph T. Impellitteri
Principal Investigator

July 31, 1968

VOCATIONAL – INDUSTRIAL EDUCATION **Research Report**

PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION

Bureau of Vocational, Technical
and Continuing Education

VT007 573

MEMORANDUM

TO: The ERIC Clearinghouse on Vocational and Technical Education
The Ohio State University
980 Kinnear Road
Columbus, Ohio 43212

FROM: (Person) Clarence A. Dittenhafer (Agency) Pa. RCU

(Address) Bureau of Research 214 Executive House Pa. Dept. Of Public Instruction
P. O. Box 911, Harrisburg, Pa. 17126

DATE: November 7, 1968

RE: (Author, Title, Publisher, Date) Impellitteri, Joseph I, The Development and Evaluation of a Pilot Computer - Assisted Occupational Guidance Program, Pennsylvania State University, July 1968

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2.	APPLIANCE SERVICEMEN	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
3.	ELECTRICAL APPLIANCE SERVICEMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
4.	ELECTRICAL APPLIANCE REPAIRMAN	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
5.	ELECTRICAL APPLIANCE SERVICEMAN	Job Information Florida State Employment Service Tallahassee, Florida
6.	ELECTRICAL-APPLIANCE SERVICEMAN	Occupational Guide Employment Security State of Idaho P. O. Box 520 Boise, Idaho
7.	ELECTRICAL-APPLIANCE SERVICEMAN	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
8.	ELECTRICAL-APPLIANCE REPAIRMAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
9.	ELECTRICAL-HOUSEHOLD-APPLIANCE SERVICEMAN	Careers Largo, Florida
10.	EMPLOYMENT OUTLOOK FOR APPLIANCE SERVICEMEN	Superintendent of Documents Washington, D.C. 20402
11.	FINDING OUT ABOUT HOME APPLIANCE SERVICEMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois

	TITLE	ADDRESS
12.	GAS-APPLIANCE SERVICEMAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
13.	GAS-APPLIANCE SERVICEMAN	Washington State Occupational Guide Washington
14.	HOUSEHOLD APPLIANCE REPAIRMAN	Occupational Guide State of California Department of Employment San Francisco Bay Area California
15.	HOUSEHOLD APPLIANCE REPAIRMAN	Job Guide Kansas State Employment Service 402 E. 2nd Wichita, Kansas
16.	HOME APPLIANCE SERVICEMEN	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
17.	HOUSEHOLD-APPLIANCE REPAIRMAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi

WELDER, ARC

	TITLE	ADDRESS
1.	COMBINATION WELDER	Occupational Guide Research and Statictics Section 10 North Senate Indianapolis, Indiana
2.	COMBINATION WELDER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
3.	ELECTRIC WELDING MACHINE OPERATOR	Careers Largo, Florida
4.	OPPORTUNITITES IN THE WELDING INDUSTRY	American Welding Society 345 East 47th Street New York, New York 10017
5.	WELDER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California
6.	WELDER	Chronicle Occupational Brief Service Moravia, New York 35¢
7.	WELDER, ACETYLENE	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
8.	WELDER, ARC	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
9.	WELDER, COMBINATION	Occupational Guide State of California Department of Employment San Francisco Bay Area California
10.	WELDER, COMBINATION	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho

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	TITLE	ADDRESS
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12.	WELDER, COMBINATION	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
13.	WELDER, COMBINATION	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
14.	WELDER (MANUAL)	Careers Largo, Florida
15.	WELDERS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
16.	WELDERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
17.	WELDERS AND OXYGEN CUTTERS	Careers Largo, Florida
18.	WELDERS AND OXYGEN AND ARC CUTTERS	Reprint Occupational Outlook Handbook

AUTO BODY REPAIRMAN

TITLE	ADDRESS
1. AUTOMOBILE-BODY REPAIRMAN	Careers Largo, Florida
2. AUTOMOBILE-BODY REPAIRMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
3. AUTOMOBILE-BODY REPAIRMAN: METAL (BODY AND FENDER MAN)	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
4. AUTOMOBILE BODY REPAIRMAN	Job Guide Kansas State Employment Service 552 State Avenue Kansas City, Kansas
5. AUTOMOBILE-BODY REPAIRMAN	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan
6. AUTOMOBILE-BODY REPAIRMAN	Michigan Employment Security Comm. United States Employment Service 7310 Woodward Avenue Detroit, Michigan 48202
7. AUTOMOBILE-BODY REPAIRMAN, METAL	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
8. AUTOMOBILE BODY REPAIRMEN	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
9. AUTOBODY AND FENDER REPAIRMAN	Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
10. AUTOMOBILE DETAILER	Occupational Guide State of California Department of Employment Sacramento - San Joaquin Valley Area California

	TITLE	ADDRESS
11.	BODY AND FENDER MAN	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
12.	FINDING OUT ABOUT AUTOMOBILE BODY REPAIRMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois

AUTOMOBILE MECHANIC

TITLE	ADDRESS
1. AUTO ACCESSORIES AND PARTS RETAILING AS A CAREER	The Institute for Research Chicago, Illinois
2. AUTO MECHANIC	Job Information Florida State Employment Service Tallahassee, Florida
3. AUTOMOBILE AND TRUCK MECHANICS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
4. AUTOMOBILE MECHANIC (AUTOMOBILE MECHANIC APPRENTICE)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
5. AUTOMOBILE MECHANIC	Chronicle Occupational Brief Service Moravia, New York 25¢
6. AUTOMOBILE MECHANIC	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
7. AUTOMOBILE MECHANIC	Job Guide Moline-Rock Island Area Research and Statistics Section Bureau of Employment Security Room 401, 165 North Canal Street Chicago, Illinois 60606
8. AUTOMOBILE MECHANIC	Job Guide Decatur Area Research and Statistics Section Bureau of Employment Security Room 401, 165 North Canal Street Chicago, Illinois 60606
9. AUTOMOBILE MECHANIC	Job Guide Peoria Area Research and Statistics Section Bureau of Employment Security Room 401, 165 North Canal Street Chicago, Illinois 60606

TITLE	ADDRESS
10. AUTOMOBILE MECHANICS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
11. AUTOMOBILE MECHANIC	Kansas State Employment Service 652 State Avenue Kansas City, Kansas
12. AUTOMOBILE MECHANIC	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
13. AUTOMOBILE MECHANIC	Occupational Guide The New Mexico State Employment Service New Mexico
14. AUTOMOBILE MECHANICS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
15. AUTOMOBILE MECHANIC, TECHNICIAN, AND REPAIR SHOP OWNER	The Institute for Research Chicago, Illinois
16. AUTOMOBILE PARTS MAN	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
17. AUTOMOTIVE BRAKEMAN	Careers Largo, Florida
18. AUTOMOTIVE MECHANIC	Careers Largo, Florida
19. AUTOMOTIVE-MECHANIC APPRENTICE	Washington State Occupational Guide Washington
20. CAN I BE A CRAFTSMAN?	Public Relations Staff General Motors Detroit 2, Michigan
21. CAREER OPPORTUNITIES IN AUTOMOTIVE SERVICE	Automobile Manufacturers Association, Inc. 320 New Center Building Detroit, Michigan 48202

	TITLE	ADDRESS
22.	COURSES IN AUTOMOTIVE MECHANICS	Lincoln Technical Institute 472 Market Street Newark, New Jersey
23.	EMPLOYMENT OUTLOOK FOR AUTOMOTIVE SERVICE AND SALES	Superintendent of Documents. Washington, D.C. 20402
24.	FACTS FOR THE GUIDANCE COUNSELOR ADVISING STUDENTS ON CAREERS IN THE RETAIL AUTOMOTIVE BUSINESS	General Motors Corporation Detroit, Michigan
25.	FARM EQUIPMENT MECHANIC	Careers Largo, Florida
26.	FINDING OUT ABOUT AUTOMOBILE MECHANICS	Science Research Associates, Inc. 259 East Erie Street Chicago II, Illinois
27.	HI THERE . . .	General Motors Institute Flint, Michigan
28.	JOB OPPORTUNITIES IN AUTOMOTIVE SERVICE	Reprinte from: Occupational Outlook Quarterly February 1966
29.	LEARN AUTO MECHANICS AND BODY REPAIR	Vale Technical Institute Vale Tech Center Blairsville, Pa. 15717
30.	SO YOU WANT TO BE AN AUTO SERVICE TECHNICIAN . . .	Educational Affairs Department The American Road Dearborn, Michigan
31.	MOTORCYCLE MECHANIC	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Area California
32.	THE RETAIL AUTOMOBILE BUSINESS	General Motors Corporation Detroit, Michigan
33.	THERE IS A FUTURE FOR YOU IN THE AUTOMOTIVE REPAIR FIELD	Independent Garage Owners of America, Inc. 343 South Dearborn Chicago, Illinois 60604

	TITLE	ADDRESS
34.	TRUCK MECHANIC	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
35.	TRUCK MECHANIC	Careers Largo, Florida
36.	YOUR CAREER IN THE RETAIL AUTOMOBILE INDUSTRY	NADA Public Relations Committee 2000 K Street, N.W, Washington, D.C. 20006

AUTOMOBILE SERVICE STATION ATTENDANT

	TITLE	ADDRESS
1.	AUTOMOBILE-SERVICE-STATION-ATTENDANT	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
2.	AUTOMOBILE-SERVICE-STATION-ATTENDANT	Kansas State Employment Service 552 State Avenue Kansas City, Kansas
3.	AUTOMOBILE-SERVICE-STATION ATTENDANT	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
4.	AUTOMOBILE SERVICE STATION ATTENDANT	Florida State Employment Service Job Information Tallahassee, Florida
5.	AUTOMOTIVE-SERVICE-STATION ATTENDANT	Careers Largo, Florida
6.	CAREER OPPORTUNITIES IN AUTOMOTIVE SERVICE	Automobile Manufacturers Association, Inc. 320 New Center Building Detroit, Michigan 48202
7.	CHECK LIST OF ON-THE-JOB TRAINING EXPERIENCES FOR SERVICE STATION EMPLOYEES	American Petroleum Institute Division of Marketing 1271 Avenue of the Americas New York, New York 10020
8.	GARAGE SERVICE SALESMAN	Occupational Guide State of California Department of Employment Sacramento Valley-San Joaquin Valley Area California
9.	PETE THE SERVICE STATION ATTENDANT	McGraw-Hill Book Company New York, New York
10.	SELECTING SERVICE STATION EMPLOYEES	American Petroleum Institute 1271 Avenue of the Americas New York, New York 10020
11.	SERVICE STATION ATTENDANT	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Area California

	TITLE	ADDRESS
12.	SERVICE STATION MANAGER	Chronicle Occupational Brief Service Moravia, New York
13.	SERVICE STATION OPERATION AS A CAREER	The Institute for Research Chicago, Illinois
14.	SERVICE STATION SALESMAN	Chronicle Occupational Brief Service Moravia, New York

AVIATION MECHANIC

	TITLE	ADDRESS
1.	AERO MECHANICS F.A.A. APPROVED SCHOOL	13214 French Road (48234) 891-0680 North End of Detroit City Airport Detroit, Michigan
2.	AERO MECHANICS HIGH SCHOOL	13214 French Road (48234) 891-0680 North End of Detroit City Airport Detroit, Michigan
3.	AIRCRAFT MECHANIC	Chronicle Occupational Brief Service Moravia, New York
4.	AIRFRAME AND POWER PLANT MECHANIC	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
5.	AIRPLANE MECHANIC	Careers Largo, Florida
6.	AIRPLANE MECHANIC	Personnel Service, Inc. Sydney F. Austin, Editor P. O. Box 306 Jaffrey, New Hampshire
7.	AIRPLANE MECHANIC	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
8.	AIRPLANE MECHANICS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
9.	AIRPLANE MECHANICS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
10.	ATD-TWU AND JET SAFETY	Publicity and Education Department Transport Workers Union of America, AFL-CIO 210 West 50th Street New York 19, New York
11.	CAREER AS A JET ENGINE TECHNICIAN AND MECHANIC	The Institute for Research Chicago, Illinois

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12.	CAREER AS AN AVIATION MECHANIC	The Institute for Research Chicago, Illinois
13.	CAREER OPPORTUNITIES WITH THE AIRLINES	Air Transport Association of America 1000 Connecticut Avenue, N.W. Washington 6, D.C.
14.	CAREERS IN AVIATION	Flying Magazine - Aug. 1963 (Reprinted by:) National Aerospace Education Council 616 Shoreham Building 806 15th Street, N.W. Washington, D.C. 20005
15.	ADVISORY CIRCULAR	Federal Aviation Agency Distribution Unit, HQ-438 Washington, D.C. 20553
16.	GENERAL APPLICANT INFORMATION	Federal Aviation Agency Distribution Unit, HQ-3300 Washington, D. C. 20553
17.	FAA REGIONAL ADDRESS LIST	Federal Aviation Agency Distribution Unit, HQ-3300-10 Washington, D.C. 20553
18.	FEDERAL AVIATION AGENCY DISTRICT OFFICES	Federal Aviation Agency Distribution Unit, HQ-3824 Washington, D.C. 20553
19.	FINDING OUT ABOUT AIRPLANE MECHANICS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
20.	FROM THE GROUND UP	Detroit's Aero Mechanics Vocational High School 13214 French Road North End of Detroit City Airport Detroit, Michigan
21.	GROUND CAREERS WITH AIR LINES AND AT AIRPORTS	The Institute for Research Chicago, Illinois
22.	INFORMATION ON CAREERS IN AVIATION	Federal Aviation Agency Washington, D.C. 20553
23.	INFORMATION ON MECHANIC CERTIFICATES	Federal Aviation Agency Washington, D.C. 20553

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24.	OCCUPATIONAL OUTLOOK QUARTERLY	United States Government Printing Office Division of Public Documents Washington, D.C. 20402
25.	PITTSBURGH INSTITUTE OF AERONAUTICS	Pittsburgh Institute of Aeronautics P. O. 10897 Pittsburgh, Pennsylvania 15236
26.	STATUS OF THE FEDERAL AVIATION REGULATIONS	Federal Aviation Agency Washington, D.C. 20553
27.	THE VANISHING MECHANIC	An AOPA Pilot Special Report
28.	YOUR CAREER IN AVIATION	National Aerospace Education Council 616 Shoreham Building 806-15th Street, N.W. Washington, D.C. 20005

BARBER

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2.	BARBER	Job Information Florida State Employment Service Tallahassee, Florida
3.	BARBER	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
4.	BARBER	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
5.	BEAUTY OPERATOR	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi

BRICKLAYER

	TITLE	ADDRESS
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2.	BRICKLAYER	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
3.	BRICKLAYER	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
4.	BRICKLAYER	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
5.	BRICKLAYER	Counseling Section Ohio State Employment Service Ohio
6.	BRICKLAYERS	Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
7.	BRICKLAYERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
8.	BRICKLAYERS	The Associated General Contractors of America 1957 E Street, N. W. Washington 6, D. C.
9.	BRICKLAYER APPRENTICE	Careers Largo, Florida
10.	BRICKLAYER APPRENTICE	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
11.	BRICKLAYER APPRENTICE	Job Guide Department of Labor and Industrial Relations Bureau of Employment Security Honolulu, Hawaii

	TITLE	ADDRESS
12.	BRICKLAYER, BRICKLAYER APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area California
13.	BRICKLAYER (Const.)	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
14.	BRICKLAYING AS A VOCATION	American Vocational Journal - Feb. 1957 (Reprinted by:) Mason Relations Department Structural Clay Products Institute 1520 18th Street, N.W. Washington 6, D. C.
15.	BRICKMASON	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
16.	FINDING OUT ABOUT BRICKLAYERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
17.	STONEMASON	Employment Information Series Counseling Section Ohio State Employment Service Ohio
18.	THE BRICKLAYERS' STORY	The American Federationist - May 1955 (Reprinted by:) Bricklayers, Masons and Plasterers' International Union 815 Fifteenth Street, N.W. Washington, D.C.
19.	WITH BRICK AND MORTAR	Careers Largo, Florida

BROADCAST STATION TECHNICIAN

	TITLE	ADDRESS
1.	BROADCAST TECHNICIAN	Careers Largo, Florida
2.	BROADCAST TECHNICIAN (TELEVISION)	Occupational Guide State of California Department of Employment Hollywood, California
3.	BROADCAST TECHNICIANS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
4.	BROADCASTING OCCUPATIONS	Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
5.	CAREERS IN RADIO	National Association of Broadcasters 1771 N Street, N.W. Washington, D.C. 20036
6.	CAREERS IN TELEVISION	National Association of Broadcasters 1771 N Street, N.W. Washington, D.C. 20036
7.	FINDING OUT ABOUT BROADCAST TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
8.	JOB OPPORTUNITIES IN TELEVISION	Department of Information National Broadcasting Company 30 Rockefeller Plaza New York 20, New York
9.	OPPORTUNITIES IN RADIO	Vocational Guidance Manuals, Inc. 45 West 45 Street New York 19, New York
10.	RADIO ANNOUNCER	Washington State Occupational Guide Employment Security Department Washington
11.	RADIO (TELEVISION) ANNOUNCER	Employment Information Series Counseling Section Ohio State Employment Service Ohio

	TITLE	ADDRESS
2.	RADIO AND TV BROADCASTING OCCUPATIONS	Job Brief Michigan Employment Security Commision 7310 Woodward Detroit, Michigan 48202
3.	RADIO-TV BROADCASTING TECHNICIANS	Chronicle Occupational Brief Service Moravia, New York
4.	RADIO TELEVISION INDUSTRY	Employment Information Series Counseling Section Ohio State Employment Service Ohio
5.	TELEVISION BROADCAST TECHNICIAN	Washington State Occupational Guide Employment Security Department Washington

CABINET MAKER

	TITLE	ADDRESS
1.	APPRENTICESHIP STANDARDS FOR MILL AND CABINET MAKING	United Brotherhood of Carpenters and Joiners of America Educational Department 101 Constitution Avenue, N.W. Washington, D. C. 20001
2.	CABINETMAKER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California
3.	CABINETMAKER	Careers Largo, Florida
4.	CABINETMAKER	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
5.	CABINETMAKER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
6.	CABINET MAKER I	Job Information Florida State Employment Service Tallahassee, Florida
7.	CABINETMAKER CABINETMAKER APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area California
8.	CABINET MAKER, MAINTENANCE (FURNITURE REPAIRMAN)	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
9.	CARPENTER, FINISH	Occupational Guide Mississippi Employment Commission Jackson, Mississippi
10.	GENERAL WOODWORKING OCCUPATIONS	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi

CARPENTER

	TITLE	ADDRESS
1.	APPRENTICE TRAINING SCHOOL CONSTRUCTION TRADES	General Information The Board of Education of the City of Detroit Detroit, Michigan
2.	APPRENTICESHIP STANDARDS FOR CARPENTER AND JOINERS	United Brotherhood of Carpenters and Joiners of America 101 Constitution Avenue, N.W. Washington, D. C. 20001
3.	BUILDING YOUR FUTURE	The Library National Housing Center 1625 L Street, N.W. Washington 6, D.C.
4.	CAREER AS A CARPENTER AND RESIDENTIAL BUILDING CONTRACTOR	The Institute for Research Chicago, Illinois
5.	CARPENTER	Chronicle Occupational Brief Service Moravia, New York
6.	CARPENTER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
7.	CARPENTERS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
8.	CARPENTERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
9.	CARPENTER (CONST.)	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
10.	CARPENTER (CONST.)	Employment Information Series Counseling Section Ohio State Employment Service Ohio

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13.	CARPENTER, CARPENTER APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area California
14.	CARPENTER, CONSTRUCTION	Careers Largo, Florida
15.	CARPENTER, CONSTRUCTION	Job Information Florida State Employment Service Tallahassee, Florida
16.	CARPENTRY	The Associated General Contractors of America, Inc. 1957 E Street, N.W. Washington 6, D.C.
17.	CONSTRUCTION CARPENTER	Department of Labor and Industry Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
18.	EMPLOYMENT OUTLOOK FOR CARPENTERS	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402 10¢
19.	FINDING OUT ABOUT CARPENTERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
20.	NATIONAL STANDARDS FOR CARPENTRY APPRENTICESHIP	U. S. Department of Labor Bureau of Apprenticeship and Training Washington, D.C. 20210

	TITLE	ADDRESS
21.	OCCUPATIONAL GUIDE FOR CARPENTER	The New Mexico State Employment Service New Mexico
22.	THE CARPENTER (AUGUST, 1966)	101 Constitution Avenue, N.W. Washington, D. C. 20001
23.	THE CARPENTER (OCTOBER, 1966)	101 Constitution Avenue, N.W. Washington, D. C. 20001
24.	THE CARPENTER (APRIL, 1967)	101 Constitution Avenue, N.W. Washington, D.C. 20001
25.	THEY KEPT AHEAD OF THE FUTURE . . .	Apprenticeship Department of the United Brotherhood of Carpenters and Joiners of America 101 Constitution Avenue, N.W. Washington, D.C. 20001
26.	TOP HAND IN THE BUILDING TRADES	National Lumber Manufacturers Association

CHEMICAL LABORATORY TECHNICIAN

	TITLE	ADDRESS
1.	A BRIGHT FUTURE FOR YOU AS A CHEMICAL TECHNICIAN	Manufacturing Chemists' Association 1825 Connecticut Avenue, N.W. Washington, D.C. 20009
2.	CAREERS IN CHEMISTRY AND CHEMCIAL ENGINEERING	The Institute for Research Chicago, Illinois
3.	CHEMICAL AND METALLURGICAL TECHNOLOGIES	Superintendent of Documents U. S. Government Printing Office Washington 25, D.C. 25¢
4.	CHEMCIAL TECHNICIAN	Careers Largo, Florida
5.	CHEMICAL TECHNICIAN	Chronicel Occupational Brief Service Moravia, New York 35¢
6.	CHEMICAL TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
7.	CHEMISTRY AND YOUR CAREER	American Chemical Society 1155 16th Street N.W. Washington, D.C. 20036
8.	CHEMISTRY CAREERS FOR TOMMOROW	Careers Largo, Florida
9.	FINDING OUT ABOUT CHEMICAL TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
10.	INDUSTRIAL LABORATORY TECHNICIAN	Chronicle Occupational Brief Service Moravia, New York 35¢
11.	LABORATORY ASSISTANT	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
12.	PHYSICS TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611

COMMERCIAL AIRPLANE PILOT

	TITLE	ADDRESS
1.	AIRLINE PILOT	Occupational Guide State of California Department of Employment San Francisco Bay Area California
2.	AIR LINE PILOT	Personnel Services, Inc. Sydney F. Austin, Editor Jaffrey, New Hampshire
3.	AIRLINE PILOTS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
4.	CAN YOU TALK THE LANGUAGE OF THE AEROSPACE AGE?	Commander, USAF Recruiting Service ATTN: Director of Advertising and Publicity Wright-Patterson Air Force Base Ohio
5.	CAREER OPPORTUNITIES WITH THE AIRLINES	Air Transport Association of America 1000 Connecticut Avenue, N.W. Washington, D.C. 20036
6.	AVIATORS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
7.	CAREERS IN AVIATION	National Aerospace Education Council 616 Shoreham Building 806 15th Street, N.W. Washington, D.C. 20005
8.	COMMERCIAL PILOT	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402 75¢
9.	DIRECTORY	Vertical Lift Aircraft Council Aerospace Industries Association 1725 De Sales Street, N.W. Washington, D.C. 20036
10.	EXPLANATION OF HELICOPTER FLIGHT	Vertical Lift Aircraft Council of the Aerospace Industries Association, Inc. 1725 DeSales Street, N.W. Washington 6, D.C.

	TITLE	ADDRESS
11.	FEDERAL AVIATION REGULATIONS	Federal Aviation Agency Washington, D.C.
12.	FEDERAL AVIATION AGENCY AIRCRAFT DISPATCHER EXAMINATION GUIDE	Superintendent of Documents U. S. Government Printing Office Washinton, D.C. 20402 40¢
13.	FEDERAL AVIATION REGULATIONS CERTIFICATION: PILOTS AND FLIGHT INSTRUCTIONS	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402 50¢
14.	FINDING OUT ABOUT AIRLINE PILOTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
15.	FINDING OUT ABOUT FLIGHT ENGINEERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
16.	FINDING OUT ABOUT HELICOPTER PILOTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
17.	FLIGHT ENGINEERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
18.	FLIGHT TEST GUIDE	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402 20¢
19.	HELICOPTER ASSOCIATION OF AMERICA	P. O. Box 286 Stratford, Connecticut 06497
20.	HELICOPTER PILOTS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
21.	LAWMEN ON THE WING	Reprinted from: The Journal of American Insurance April, 1962 American Mutual Insurance Alliance 20 North Wacker Drive Chicago 6, Illinois
22.	MODERN AVIATION AS A CAREER	The Institute for Research Chicago, Illinois

TITLE	ADDRESS
23. OUR ROTOR NEWS (MARCH, 1966)	Helicopter Association of America, Inc. % John E. Ryan P. O. Box 286 Stratford, Connecticut 06497
24. OUR ROTOR NEWS (MAY, 1966)	Helicopter Associaton of America, Inc. % John E. Ryan P. O. Box 286 Stratford, Connecticut 06497
25. PILOT, COMMERCIAL AIRPLANE	Careers Largo, Florida
26. PROSPECTS OF COMMERCIAL HELICOPTERS	L. Welch Pogue Annual Meeting of the Helicpoter Association of America January 19, 1959 at the Villa Hotel. San Mateo, California
27. SAFETY. . .IN THE JET AGE	The Flight Engineers" International Association (AFL-CIO) 100 Indiana Avenue N.W. Washington, D. C. 20001
28. THE NEXT FIFTY YEARS IN AVIATION	Address to Convocation Fiftieth Anniversary of Aernautical Engineering The University of Michigan Ann Arbor, Michigan (Oct. 9, 1964)
29. THE VERSATILE HELICOPTER	Aerospace News Aerospace Industries Association of America, Inc. 1725 De Sales Street, N.W. Washington, D.C. 20036
30. TRAVEL SHORTCUT (AEROSPACE)	Aerospace Industries Association of America, Inc. 1725 De Sales Street, N.W. Washington, D.C. 20036
31. YOUR FUTURE IN AIR TRANSPORTATION	School and College Service United Air Lines P. O. Box 8800 Chicago, Illinois 60666

COMPUTER CUSTOMER ENGINEER

	TITLE	ADDRESS
1.	COMPUTER OCCUPATIONS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
2.	DATA-PROCESSING MACHINE SERVICEMEN	Science Research Associates, Inc. 259 East Serie Street Chicago, Illinois 60611
3.	EMPLOYMENT OUTLOOK FOR ELECTRONIC COMPUTER OPERATING PERSONNEL PROGRAMERS	Superintendent of Documents Washington, D. C. 20402
4.	FINDING OUT ABOUT DATA-PROCESSING MACHINE SERVICEMEN	Science Research Associates, Inc. 259 East Erie Street Chicago II, Illinois
5.	OCCUPATIONS IN ELECTRONIC COMPUTING SYSTEMS	U. S. Department of Labor Bureau of Employment Security Washington, D. C. 20210

COMPUTER PROGRAMMER

	TITLE	ADDRESS
1.	AMERICAN COUNCIL OF LEARNED SOCIEITES NEWSLETTER	345 East 46th Street New York, New York 10017
2.	ANALOG COMPUTER ENGINEER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
3.	COMPUTER OPERATOR	Personnel Services, Inc. Sydney F. Austin, Editor P. O. Box 306 Jaffrey, New Hampshire
4.	COMPUTER SYSTEMS ENGINEER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
5.	DATA-PROCESSING MACHINE OPERATORS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
6.	DATA PROCESSING PROGRAMMER	Chronicle Occupational Brief Service Moravia, New York
7.	DIGITAL COMPUTER PROGRAMER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
8.	ELECTRONIC COMPUTER PERSONNEL	Careers Largo, Florida
9.	ELECTRONIC DATA PROCESSING IN ENGINEERING SCIENCE, AND BUSINESS	United States Government Printing Office Division of Public Documents Washington, D.C. 20402
10.	FINDING OUT ABOUT PROGRAMMERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
11.	ELECTRONIC BUSINESS DATA PROCESSING PERIPHERAL EQUIPMENT OCCUPATIONS	Superintendent of Documents U. S. Government Printing Office Washington, D. C. 20402 70¢
12.	OCCUPATIONS IN ELECTRONIC COMPUTING SYSTEMS	U. S. Department of Labor Bureau of Employment Security Washington, D.C. 20210

	TITLE	ADDRESS
13.	PROGRAMMER	Careers Largo, Florida
14.	PROGRAMMER	Job Information Florida State Employment Service Tallahassee, Florida
15.	PROGRAMMER	Occupational Guide Department of Employment State of Idaho P. O. Box 520 Boise, Idaho 83701
16.	PROGRAMMER	Personnel Services, Inc. Sydney F. Austin, Editor P. O. Box 306 Jaffrey, New Hampshire
17.	PROGRAMMER	Employment Information Series Counseling Section Ohio State Employment Service Ohio
18.	PROGRAMMER (ELECTRONIC DATA PROCESSING EQUIPMENT)	Careers Largo, Florida
19.	PROGRAMMERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
20.	SERVING AS A BRAIN FOR A BRAIN	Careers Largo, Florida
21.	SHOULD YOU GO INTO ELECTRONIC COMPUTER PROGRAMMING?	American Federation of Information Processing Societies Post Office Box 55 Malibu, California
22.	SYSTEMS AND PROCEDURES ANALYST	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
23.	YOUR CAREER IN DATA PROCESSING	Data Processing Management Association 505 Busse Highway Park Ridge, Illinois 60068

CONSTRUCTION WORKER

TITLE	ADDRESS
1. CONSTRUCTION HELPERS	Careers Largo, Florida
2. EMPLOYMENT OUTLOOK FOR CONSTRUCTION LABORERS	Superintendent of Documents U. S. Government Printing Office Washington, D. C. 20402
3. HOD CARRIER	Counseling Section Ohio State Employment Service Ohio
4. LABORER	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah

COOK CHEF

	TITLE	ADDRESS
1.	A FUTURE FOR HIGH SCHOOL GRADUATES IN THE QUANTITY FOOD SERVICE INDUSTRY	H. J. Heinz Company
2.	CAREERS IN THE QUANTITY FOOD SERVICE INDUSTRY	Director of Education National Restaurant Association 1530 North Lake Shore Drive Chicago, Illinois 60610
3.	CHEF AND COOK	Job Guide Island of Oahu Department of Labor and Industrial Relations Bureau of Employment Security Honolulu, Hawaii
4.	CHEFS AND COOKS (FINE RESTAURANTS)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
5.	CHEFS-COOKS	Job Information Florida State Employment Service Tallahassee, Florida
6.	COOK (HOTEL AND RESTAURANT)	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
7.	COOK	Job Guide Kansas State Employment Service 402 East 2nd Wichita, Kansas
8.	COOK	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
9.	COOK-CHEF	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
10.	COOK, COMBINATION	Employment Information Series Counseling Section Ohio State Employment Service Bureau of Unemployment Compensation Ohio

	TITEL	ADDRESS
11.	COOKS AND CHEFS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
12.	DIRECTORY OF HOTEL AND RESTAURANT SCHOOLS	Council on Hotel, Restaurant, and Institutional Education Statler Hall Ithaca, New York 25¢
13.	PAUL BRUNET, EXECUTIVE CHEF, THE PALMER HOUSE, CHICAGO	Reprinted from: Cooking for Profit 1202 S. Park Street Madison, Wisconsin
14.	HOTEL ADMINISTRATION PROGRAM	Director, Hotel Administration Nevada Southern University 4500 Maryland Parkway Las Vegas, Nevada
15.	KITCHEN HELPER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
16.	OPPORTUNITIES FOR COLLEGE GRADUATES IN THE QUANTITY FOOD SERVICE INDUSTRY	Council on Hotel, Restaurant and Institutional Education Statler Hall Cornell University Ithaca, New York 14850
17.	OPPORTUNITIES FOR GRADUATES OF THE SCHOOL OF HOTEL, RESTUARANT & INSTITUTIONAL MANAGEMENT	Michigan State University 1965-66
18	OPPORTUNITIES FOR GRADUATES OF TWO-YEAR COLLEGE PROGRAMS IN THE QUANTITY FOOD SERVICE INDUSTRY	Council on Hotel, Restaurant and Institutional Education Statler Hall Cornell University Ithaca, New York
19.	OPPORTUNITIES FOR HIGH SCHOOL GRADUATES IN THE QUANTITY FOOD SERVICE INDUSTRY	Council on Hotel, Restaurant and Institutional Education Statler Hall Cornell University Ithaca, New York 14850
20.	PROGRAM OFFERS FUTURE FOR COOKS	By Damon Stetson The New York Times Sunday, April 18, 1965

	TITLE	ADDRESS
21.	JOHN THE SECOND BEST COOK IN TOWN	McGraw-Hill Book Company New York, New York
22.	PROFESSIONAL COOK AND EXECUTIVE CHEF	The Institute for Research Chicago, Illinois
23.	SCHOLARSHIPS IN HOTEL AND RESTAURANT SCHOOLS	Council on Hotel, Restaurant, and Institutional Education Statler Hall Ithaca, New York 25¢
24.	SHORT ORDER COOK (CLASS B RESTAURANTS)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
25.	THE CULINARY INSTITUTE OF AMERICA	Angell Square 393 Prospect Street New Haven, Connecticut 06511
26.	THE SCIENCE AND TECHNOLOGY OF FOOD	Executive Secretary Institute of Food Technologists 176 West Adams Street Chicago, Illinois 60603
27.	THERE'S A FUTURE FOR HIGH SCHOOL GRADUATES IN THE RESTAURANT INDUSTRY	National Restaurant Association 1530 N. Lake Shore Drive Chicago 10, Illinois
28.	YOUR CAREER IN THE HOTEL-MOTEL INDUSTRY	Educational Institute of the American Hotel and Motel Assn. 221 W. 57th Street New York, New York

IBM MACHINE OPERATOR

	TITLE	ADDRESS
1.	A B C'S OF ADP	Data Processing Management Assoc. 524 Busse Highway Park.Ridge, Illinois 60068
2.	CARD-TAPE-CONVERTER OPERATOR	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
3.	CAREERS IN ELECTRONIC DATA PROCESSING	National Science Teachers Assoc. 1201 Sixteenth Street Washington 6, D.C.
4.	COMMUNICATIONS OF THE ACM	ACM Headquarters 211 E 43 Street New York, New York 10017
5.	COMPUTER OCCUPATIONS	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah 84111
6.	COMPUTER OPERATOR	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
7.	DATA PROCESSING OCCUPATIONAL FACTS	Indiana Employment Security Division 10 North Senate Avenue Indianapolis, Indiana 46204
8.	DATA PROCESSING EQUIPMENT TECHNICAIN	Occupational Guide State of California Department of Employment San Diego Area California
9.	HIGH-SPEED-PRINTER OPERATOR	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
10.	KEY-PUNCH OPERATOR	Job Information Florida State Employment Service Tallahassee, Florida
11.	KEY-PUNCH OPERATOR	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana

TITLE	ADDRESS
12. KEY-PUNCH OPERATOR	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
13. KEY-PUNCH OPERATOR	Employment Information Series Counseling Section Ohio State Employment Service Ohio
14. KEY-PUNCH OPERATOR	Washington State Occupational Guide Washington
15. KEY PUNCH OPERATOR	State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
16. KEY PUNCH OPERATOR	Careers Largo, Florida
17. KEY PUNCH OPERATOR	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
18. KEY PUNCH OPERATORS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
19. KEY PUNCH OPERATOR	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
20. MIGHTY NEW SERVANT TO THE MIND OF MAN	UNIVAC Division of Sperry Rand Corporation
21. OFFICE MACHINE OPERATOR	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
22. OFFICE MACHINE OPERATORS	Employment Information Series Counseling Section Ohio State Employment Service Ohio

	TITLE	ADDRESS
23.	PROFILE OF A SYSTEMS MAN	Systems and Procedures Association 7890 Brookside Drive Cleveland, Ohio 44138
24.	PUBLICATIONS	Systems and Procedures Association 7890 Brookside Drive Cleveland, Ohio 44138
25.	QUESTIONS AND ANSWERS ABOUT SPA	Systems and Procedures Association 7890 Brookside Drive Cleveland, Ohio 44138
26.	SERVICE TECHNICIAN (DATA PROCESSING SYSTEMS)	Occupational Guide State of California Department of Employment San Francisco Bay Area San Jose Area California
27.	SUPERVISOR, MACHINE-RECORDS UNIT	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
28.	SYSTEMATION: THE ADVENT OF SYSTEMATIC MANAGEMENT	Systems and Procedures Association 17th International Systems Meeting Philadelphia, Pa.
29.	SYSTEMS AND PROCEDURES ASSOCIATION - EVOLUTION OF A NEW MANAGEMENT PHILOSOPHY	Reprint Business Publications, Inc.
30.	SYSTEMS AND PROCEDURES JOURNAL	Systems and Procedures Association 7890 Brookside Drive Cleveland, Ohio 44138
31.	SYSTEMS EDUCATION MONOGRAPH No. 4	Systems and Procedures Association 7890 Brookside Drive Cleveland, Ohio 44138
32.	TABULATING-MACHINE OPERATOR	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
33.	TABULATING-MACHINE OPERATOR	Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202

	TITLE	ADDRESS
34.	TABULATING-MACHINE OPERATOR	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
35.	TABULATING MACHINE OPERATOR	Job Information Florida State Employment Service Tallahassee, Florida
36.	THE QUIET REVOLUTION: COMPUTERS COME OF AGE	American Federation of Information Processing Societies 211 East 43rd Street New York, New York 10017
37.	VERIFIER-SORTER OPERATOR	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
38.	WHAT IS IT?	Association for Computing Machinery 211 East 43rd Street New York, New York 10017
39.	COMPUTER OPERATOR	Employment Information Series Counseling Section Ohio State Employment Service Ohio

DIESEL MECHANIC

	TITLE	ADDRESS
1.	CAREERS IN DIESEL ENGINEERING AND AS A DIESEL TECHNICIAN	The Institute for Research Chicago, Illinois
2.	DIESEL-MECHANIC APPRENTICE	Washington State Occupational Guide Washington
3.	DIESEL MECHANIC	Careers Largo, Florida
4.	DIESEL MECHANIC	Chronicle Occupational Brief Service Moravia, New York 35¢
5.	DIESEL MECHANIC	Job Information Florida State Employment Service Tallahassee, Florida
6.	DIESEL MECHANIC	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idahc
7.	DIESEL MECHANIC	Personnel Services, Inc. Sydney F. Austin, Editor Jaffrey, New Hampshire
8.	DIESEL MECHANICS	Occupational Outlook Handbook
9.	DIESEL MECHANICS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
10.	DIESEL TECHNICIAN	Chronicle Occupational Brief Service Moravia, New York 25¢
11.	FINDOUT OUT ABOUT DIESEL MECHANICS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
12.	YOUR FUTURE IN THE DIESEL AND GAS ENGINE INDUSTRY	Diesel Engine Manufacturers Assoc. 122 East 42nd Street New York, New York 10017

MECHANICAL DRAFTSMAN

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2.	AMERICAN INSTITUTE FOR DESIGN AND DRAFTING'S	American Institute for Design and Drafting Drafting Survey Spring Seminar Carnegie Institute of Technology Pittsburgh, Pennsylvania
3.	APPRENTICESHIP AND TRAINING STANDARDS FOR DRAFTSMEN	U. S. Government Printing Office Washington, D.C.
4.	ARCHITECTURAL TECHNICIAN	Careers Largo, Florida
5.	CAN I BE A DRAFTSMAN?	Public Relations Staff General Motors Detroit, Michigan
6.	CAREER AS A DRAFTSMAN	The Institute for Research Chicago, Illinois
7.	CAREER AS AN ENGINEERING DRAFTSMAN	The Institute for Research Chicago, Illinois
8.	CAREERS IN INDUSTRIAL DESIGN	Career Information Center Northeastern University Boston, Massachusetts
9.	DRAFTING AS A CAREER	American Institute for Design and Drafting 18465 James Couzens Detroit, Michigan 48235
10.	DRAFTING AS A VOCATION	Information sheet
11.	DRAFTSMAN ARCHITECTURAL, ELECTRICAL MARINE, MECHANICAL, STRUCTURAL	Occupational Guide State of California Department of Employment San Francisco Bay Area California
12.	DRAFTSMAN (CIVIL ENGINEERING AND RELATED)	Occupational Guide State of California Department of Employment San Francisco Bay Area - San Jose Area California

	TITLE	ADDRESS
13.	DRAFTSMAN (ELECTRONICS INDUSTRY)	Occupational Guide State of California Department of Employment San Jose Metropolitan Area California
14.	DRAFTSMAN	Chronicle Occupational Brief Service Moravia, New York 25¢
15.	DRAFTSMAN	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
16.	DRAFTSMAN	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
17.	DRAFTSMAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
18.	DRAFTSMAN	Washington State Occupational Guide Washington
19.	DRAFTSMAN-MANUFACTURING	Recommend Work Schedule sheet
20.	DRAFTSMEN	Careers Largo, Florida
21.	DRAFTSMEN	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
22.	DRAFTSMEN FIND VARIED WORK	Careers Largo, Florida
23.	ENGINEERING GRAPHICS	Keuffel & Esser Co. 904 Chestnut Street Philadelphia, Pennsylvania 19107

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24. FINDING OUT ABOUT DRAFTSMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
25. MECHANICAL DRAFTING AND DESIGN TECHNOLOGY	United States Government Printing Office Division of Public Documents Washington, D.C. 20402
26. MECHANICAL DRAFTSMAN	Careers Largo, Florida
27. MECHANICAL DRAFTSMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
28. MECHANICAL DRAFTSMAN	Job Information Florida State Employment Service Tallahassee, Florida
29. DRAFTSMAN, MECHANICAL	Employment Information Series Counseling Section Ohio State Employment Service Ohio
30. OCCUPATIONAL GUIDE FOR DRAFTSMAN	Employment Security Department of South Dakota Sioux Falls, South Dakota
31. SHOULD YOU BE A DRAFTSMAN?	Career Information Service New York Life Insurance Company Box 51, Madison Square Station New York 10, New York
32. TECHNICAL ILLUSTRATOR (TECHNICAL ARTIST)	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Area California
33. TECHNICAL ILLUSTRATOR	Careers Largo, Florida
34. THE ART OF GOOD LETTERING	American Institute for Design and Drafting 18465 James Couzens Highway Detroit 35, Michigan

	TITLE	ADDRESS
35.	THE NEED & THE PLAN	American Institute for Design and Drafting 18465 James Couzens Highway Detroit, Michigan 48235
36.	TRACER	Careers Largo, Florida

ELECTRICIAN

	TITLE	ADDRESS
1.	ADMINISTRATIVE AND TECHNICAL CAREERS WITH ELECTRIC UTILITIES	The Institute for Research Chicago, Illinois
2.	CAREERS IN ELECTRICAL WIRING AND ELECTRICAL CONTRACTING	The Institute for Research Chicago, Illinois
3.	CONSTRUCTION ELECTRICIAN	Chronicle Occupational Brief Service Moravia, New York 35¢
4.	ELECTRICIAN (CONSTRUCTION)	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
5.	ELECTRICIAN	Occupational Guide Department of Employment State of Idaho P. O. Box 520 Boise, Idaho 83701
6.	ELECTRICIAN	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
7.	ELECTRICIAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
8.	ELECTRICIAN	Personnel Services, Incorporated Sydney F. Austin, Editor Jaffrey, New Hampshire
9.	ELECTRICIAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
10.	ELECTRICIAN	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
11.	ELFCTRICIAN APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area California

TITLE	ADDRESS
12. ELECTRICIAN APPRENTICE (CONSTRUCTION)	Job Guide Island of Oahu Department of Labor and Industrial Relations Bureau of Employment Security Honolulu, Hawaii
13. ELECTRICIAN, CONSTRUCTION	Careers Largo, Florida
14. ELECTRICIAN (CONSTRUCTION)	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
15. ELECTRICIAN, ELECTRICIAN APPRENTICE (CONSTRUCTION AND SHIPBUILDING)	Occupational Guide State of California Department of Employment San Francisco Area California
16. ELECTRICIANS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
17. ELECTRICIANS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
18. ELECTRICIANS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
19. ELECTRICIANS & ELECTRICAL EQUIPMENT	Chronicle Occupational Brief Service Moravia, New York 35¢
20. EMPLOYMENT OUTLOOK FOR CONSTRUCTION ELECTRICIANS	Superintendent of Documents Washington, D.C. 20402
21. FINDING OUT ABOUT ELECTRICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
22. MAINTENANCE ELECTRICIAN	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California

	TITLE	ADDRESS
23.	MAINTENANCE ELECTRICIAN	Careers Largo, Florida
24.	MAINTENANCE ELECTRICIANS	Mechanics and Repairmen Occupational Outlook Handbook
25.	THE ELECTRICAL WORKERS' STORY	Brotherhood of Electrical Workers (AFL-CIO & CLC) 1200 - 15th Street, N.W. Washington, D. C. 20005
26.	THE NUCLEUS APPRENTICESHIP OF CRAFTSMANSHIP	Mr. Buck Baker 1200 - 18th Street, N.W. Washington 6, D.C.

ELECTRONICS TECHNICIAN

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1.	CAREERS IN ELECTRONICS	The Institute for Research Chicago, Illinois
2.	DIRECTORY OF TECHNICAL INSTITUTE COURSES	National Council of Technical Schools 1507 M Street, N.W. Washington, D.C. 20005
3.	ELECTRICAL AND ELECTRONIC TECHNOLOGIES	U. S. Government Printing Office Division of Public Documents Washington, D.C. 20402
4.	ELECTRICAL ENGINEERING TECHNICAIN	Careers Largo, Florida
5.	ELECTRICAL TECHNICIAN	Chronicle Occupational Brief Service Moravia, New York 25¢
6.	ELECTRONICS MECHANIC	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
7.	ELECTRONIC TECHNICIAN	Chronicle Occupational Brief Service Moravia, New York 35¢
8.	ELECTRONIC TECHNICIAN	Washington State Occupational Guide Washington
9.	ELECTRONIC TECHNICIANS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
10.	ELECTRONICS TECHNICIAN #41	Occupational Guide State of California Department of Employment San Jose Metropolitan Area California
11.	ELECTRONICS TECHNICIAN #60	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
12.	ELECTRONICS TECHNICIAN	Job Information Florida State Employment Service Tallahassee, Florida

TITLE	ADDRESS
13. ELECTRONICS TECHNICIAN	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
14. ELECTRONIC TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
15. ELECTRONICS TECHNICIAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
16. ELECTRONICS TECHNICIANS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
17. EMPLOYMENT OUTLOOK IN ELECTRONICS MANUFACTURING OCCUPATIONS	Superintendent of Documents Washington, D.C. 20402
18. ENGINEERING TECHNICIANS	Chronicle Occupational Brief Service Moravia, New York 25¢
19. ENGINEERING TECHNOLOGY CAREERS	National Council of Technical Schools 1507 M Street, N.W. Washington, D. C. 20005
20. FINDING OUT ABOUT ELECTRONIC TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
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22. INDUSTRIAL ELECTRONICS TECHNICIAN	Careers Largo, Florida
23. NORTHWESTERN ELECTRONICS INSTITUTE	3800 Minnehaha Avenue Minneapolis, Minnesota 55406
24. NOW IS THE TIME TO LOOK AT YOUR FUTURE WITH A CAREER IN ELECTRONICS	Radio Engineering Institute 2610 Leavenworth Omaha 5, Nebraska

ELECTRONICS TECHNICIAN (Continued)

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26. PLANNING A CAREER IN ELECTRONICS	Electronic Industries Association 2001 Eye Street, N.W. Washington, D.C. 20006
27. RADIO ENGINEERING INSTITUTE	2610 Leavenworth Street Omaha, Nebraska 68105
28. STANDARDS OF APPRENTICESHIP	National Alliance of Television and Electrical Service Associations
29. YOUR CAREER IN ELECTRONICS	Northwestern Electronics Institute Minneapolis, Minnesota
30. YOUR CHALLENGE IN ELECTRICAL ENGINEERING	Institute of Electrical and Electronics Engineers, Inc. 345 East 47th Street New York, New York 10017

FARMER

TITLE	ADDRESS
1. AGRICULTURE IS MORE THAN FARMING	The Future Farmers' Supply Service P. O. Box 1180 Alexandria, Virginia
2. FARM EQUIPMENT MECHANIC	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
3. FARM EQUIPMENT OPERATOR	Occupational Guide State of California Department of Employment North and Central Coast Counties California
4. FARM EQUIPMENT OPERATOR I	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
5. FARM EQUIPMENT OPERATOR II	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
6. FARMHAND, GENERAL	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
7. FARM MANGER	Occupational Guide State of California Department of Employment North and Central Coast Counties California
8. FARMERS AND FARMHANDS	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
9. FARMING IN THE U.S.	Superintendent of Documents U. S. Government Printing Office Washington 25, D.C. 20¢
10. GENERAL FARM HAND	Occupational Guide State of California Department of Employment North and Central Coast Counties California

FARMER (Continued)

	TITLE	ADDRESS
11.	HOW TO PICK BERRIES	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
12.	HOW TO PICK FRUIT	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
13.	HOW TO WEED AND PICK VEGETABLES	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
14.	IRRIGATOR	Occupational Guide State of California Department of Employment North and Central Coast Counties California
15.	LIVESTOCK HAND	Occupational Guide State of California Department of Employment North and Central Coast Counties California
16.	MANAGER, FARM	Employment Information Series Counseling Section Ohio State Employment Service Ohio
17.	MILKER	Occupational Guide State of California Department of Employment North and Central Coast Counties California
18.	NURSERYMAN	Kansas State Employment Service Job Guide 402 E 2nd Wichita, Kansas
19.	ORCHARD PRUNER	Occupational Guide State of California Department of Employment North and Central Coast Counties California

	TITLE	ADDRESS
20.	POULTRY FARM HAND	Occupational Guide State of California Department of Employment Southern California California
21.	POULTRY HUSBANDMAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
22.	RANCH HAND	Job Guide Department of Employment Security 174 Socal Hall Avenue Salt Lake City, Utah 84111
23.	SHOULD YOU BE A FARMER?	Career Information Service New York Life Insurance Company Box 51, Madison Square Station New York, New YOrk 10010
24.	SUGAR BEET WORKER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah

HEAVY CONSTRUCTION EQUIPMENT OPERATOR

	TITLE	ADDRESS
1.	CONSTRUCTION EQUIPMENT OPERATING COURSES	The Associated General Contractors of America, Inc. 1957 E Street, N.W. Washington, D. C.
2.	CONSTRUCTION MACHINERY OPERATOR	Occupational Guide State of California Department of Employment San Francisco Bay Area California
3.	CONSTRUCTION MACHINERY OPERATORS	Chronicle Occupational Brief Service Moravia, New York 35¢
4.	CONSTRUCTION MACHINERY WORKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
5.	FINDING OUT ABOUT CONSTRUCTION MACHINERY OPERATORS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
6.	FORK LIFT OPERATOR	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
7.	LEARN YOUR WAY TO BETTER PAY	National School of Heavy Equipment Operation Enrollment Division P. O. Drawer 1686 Charlotte 1, North Carolina
8.	LOOKING AHEAD . . .	International Union of Operating Engineers Local Union No. 137 Westchester Community College Valhalla, New York
9.	NO, YOU DON'T HAVE TO GO TO COLLEGE	Reprinted from <u>Changing Times</u> The Kiplinger Magazine 1729 H Street, N.W. Washington, D.C. 20006
10.	OPERATING ENGINEER	The Associated General Contractors of America, Inc. 1957 E Street, N.W. Washington 6, D.C.

	TITLE	ADDRESS
11.	OPERATING ENGINEER	Occupational Guide State of California Department of Employment San Diego Area California
12.	OPERATING ENGINEER	Job Information Florida State Employment Service Tallahassee, Florida
13.	OPERATING ENGINEER (CONST.) FORMERLY OPERATING ENGINEER (CONST.) II	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
14.	OPERATING ENGINEER II	Employment Information Series Counseling Section Ohio State Employment Service Ohio
15.	OPERATING ENGINEER	Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
16.	PEACE CORPS	Re: National School of Heavy Equipment Labor Recruiting Office Office of Public Affairs - Room 600 Peace Corps Washington, D.C. 20525
17.	POWER-SHOVE OPERATOR	Careers Largo, Florida
18.	SPECIAL COURSE FOR GRADUATE ENGINEERS	The Blade National School of Heavy Equipment Operation P. O. Box 8529 Charlotte, North Carolina
19.	THE HEAVY EQUIPMENT OPERATOR	Reprint request by: The National Schools of Heavy Equipment Operation Charlotte, North Carolina
20.	TODAY THE EARTH TOMORROW THE MOON	National School of Heavy Equipment Operation P. O. Box 8529 Charlotte, North Carolina

LINEMAN

	TITLE	ADDRESS
1.	CABLE SPLICER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California
2.	ELECTRICAL TRANSMISSION OCCUPATIONS	Careers Largo, Florida
3.	EMPLOYMENT OUTLOOK IN ELECTRIC LIGHT AND POWER OCCUPATIONS	Superintendent of Documents Washington, D.C. 20402
4.	EMPLOYMENT OUTLOOK IN TELEPHONE OCCUPATIONS	Occupational Outlook Handbook
5.	FINDING OUT ABOUT LINEMEN	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois
6.	LINEMAN	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Area California
7.	LINEMAN (LIGHT, HEAT, POWER)	Chronicle Occupational Brief Service Moravia, New York 35¢
8.	LINEMAN (POWER OR TELEPHONE)	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
9.	LINEMEN AND CABLE SPLICERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
10.	MANPOWER RESEARCH BULLETIN	U. S. Department of Labor Manpower Administration Office of Manpower Policy, Evaluation and Research Washington, D.C. 20210
11.	ON THE MOVE	Western Union
12.	TELEPHONE LINEMEN & CABLE SPLICERS	Careers, Largo, Florida

MACHINIST

	TITLE	ADDRESS
1.	FINDING OUT ABOUT MACHINISTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
2.	JOB ENTRY TRAINING PROGRAM TEXTS	National Machine Tool Builders' Assoc. 2139 Wisconsin Avenue, N.W. Washington, D.C. 20007
3.	MACHINE SET-UP OPERATOR	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
4.	MACH., SHOP & REL., OCCUP.	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
5.	MACHINE TOOL OPERATOR	Occupational Guide Division of Employment Security Missouri
6	MACHINE TOOL OPERATORS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
7.	MACHINE TOOLS AMERICA'S MUSCLES	National Machine Tool Builders' Association 2139 Wisconsin Avenue Washington 7, D.C.
8.	MACHINE TOOLS . . .TODAY	National Machine Tool Builders' Association 2139 Wisconsin Avenue, N.W. Washington, D.C. 20007
9.	MACHINIST	Occupational Guide State of California Department of Employment San Francisco Bay Area California
10.	MACHINIST	Chronicel Occupational Brief Service Moravia, New York 35¢
11.	MACHINIST	Job Information Florida State Employment Service Tallahassee, Florida

	TITLE	ADDRESS
12.	MACHINIST	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
13.	MACHINIST	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
14.	MACHINIST	Kansas State Employment Service 402 E. 2nd Wichita, Kansas
15.	MACHINIST	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
16.	MACHINIST	Personnel Services, Inc. Sydney F. Austin, Editor P. O. Box 306 Jaffrey, New Hampshire
17.	MACHINIST	Employment Information Series Counseling Section Ohio State Employment Service Ohio
18.	MACHINIST APPRENTICE	Washington State Occupational Guide Washington
19.	MACHINISTS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
20.	MACHINIST, ALL-ROUND	Careers Largo, Florida
21.	MACHINIST AND MACHINE-SHOP OPERATION AS A CAREER	The Institute for Research Chicago, Illinois
22.	MECHANICAL TECHNOLOGY DESIGN AND PRODUCTION	U. S. Government Printing Office Division of Public Documents Washington, D.C. 20402

	TITLE	ADDRESS
23.	MILLMAN, WOODWORKING	Careers Largo, Florida
24.	MACHINIST	Occupational Guide The New Mexico State Employment Service New Mexico
25.	MACHINE SHOP TRADES	Vocational Guidance Manuals Universal Publishing and Distributing Corporation 800 Second Avenue New York, New York 10017
26.	SELECTED MACHINE TRADES	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
27.	TRAINING HANDBOOK FOR APPRENTICE AND TOOLROOM MACHINE SPECIALISTS	National Tool, Die & Precision Machining Association 1411 K Street N.W. Washington, D.C. 20005

MEDICAL X-RAY TECHNICIAN

	TITLE	ADDRESS
1.	A SHORT STORY OF X-RAY TECHNOLOGY	Mimeographed paper
2.	APPROVED SCHOOLS OF X-RAY TECHNOLOGY	American Medical Association 535 North Dearborn Chicago, Illinois 60610
3.	APPROVED SCHOOLS OF X-RAY TECHNOLOGY (1965-66)	The American Society of Radiologic Technologists 537 South Main Street Fond Du Lac, Wisconsin
4.	APPROVED SCHOOLS OF X-RAY TECHNOLOGY (1966-67)	American Society of Radiologic Technologists 537 South Main Street Fond du Lack, Wisconsin 54935
5.	CAREER AS A MEDICAL X-RAY TECHNOLOGIST	The Institute for Research Chicago, Illinois
6.	CAREERS IN X-RAY TECHNOLOGY	The American Society of Radiologic Technolgists 537 South Main Street Fond Du Lac, Wisconsin 54935
7.	FINDING OUT ABOUT X-RAY TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
8.	MATERIAL AVAILABLE FOR RECRUITMENT PURPOSES	Mimeographed List
9.	MEDICAL X-RAY TECHNICIAN	Mimeographed paper
10.	MEDICAL X-RAY TECHNICIAN	Job Information Florida State Employment Service Tallahassee, Florida
11.	MEDICAL X-RAY TECHNOLOGY	The Public Relations and Career Committee for the American Society of Radiologic Technologists
12.	RADIOLOGIC TECHNOLOGIST	Washington State Occupational Guide Washington
13.	RADIOLOGIC TECHNOLOGY	The American Society of Radiologic Technologists 537 S. Main Street Fond du Lac, Wisconsin 54935

	TITLE	ADDRESS
14.	RADIOLOGIC TECHNOLOGY	The American Society of Radiologic Technologists 537 South Main Street Fond de Lac, Wisconsin 54935
15.	THE AMERICAN COLLEGE OF RADIOLOGY	The American College of Radiology 20 North Wacker Drive Chicago 6, Illinois
16.	THE AMERICAN REGISTRY OF RADIOLOGIC TECHNOLOGISTS	Executive Director Roland C. McGowan, R. T. (ARRT) 2600 Wayzata Boulevard Minneapolis, Minnesota 55405
17.	THE AMERICAN SOCIETY OF X-RAY TECHNICIANS	Genevieve Eilert, R.T. Executive Secretary The American Society of X-Ray Technicians 16 Fourteenth Street Fond du Lac, Wisconsin
18.	X-RAY TECHNICIAN, MEDICAL	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
19.	X-RAY TECHNICIAN	Chronicle Occupational Brief Service Moravia, New York 25¢
20.	X-RAY TECHNICIAN	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
21.	X-RAY TECHNICIAN	Kansas State Employment Service 402 E. 2nd Wichita, Kansas
22.	X-RAY TECHNICIAN	Job Brief Michigan Employment Security Comm. 7310 Woodward Research Unit Detroit, Michigan
23.	X-RAY TECHNICIAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi

MEDICAL X-RAY TECHNICIAN (Continued)

TITLE	ADDRESS
24. X-RAY TECHNICIAN	Occupational Guide Division of Employment Security Missouri
25. X-RAY TECHNICIAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
26. X-RAY TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
27. X-RAY TECHNOLOGIST, MEDICAL	Careers Largo, Florida

PAINTER AND PAPERHANGER

	TITLE	ADDRESS
1.	CAREER AS PAINTING CONTRACTOR	B'Nai B'Rith Vocational Service Bureau 1761 R Street, N.W. Washington, D.C.
2.	CONSTRUCTION PAINTER	Careers Largo, Florida
3.	EMPLOYMENT OUTLOOK FOR CARPENTERS, PAINTERS, PAPERHANGERS, GLAZIERS	Superintendent of Documents Washington, D.C. 20404
4.	FINDING OUT ABOUT PAINTERS AND PAPERHANGERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
5.	OPPORTUNITY IN THE PAINTING, DECORATING AND COATING TRADE	Brotherhood of Painters, Decorators, and Paperhangers of America 1925 K Street, N.W. Washington, D.C. 20006
6.	PAINTER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
7.	PAINTER, CONSTRUCTION	Chronicle Occupational Brief Service Moravia, New York 35¢
8.	PAINTER, CONSTRUCTION	Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
9.	PAINTERS	Michigan Employment Security Division 7310 Woodward Avenue Detroit, Michigan 48202
10.	PAINTERS AND PAPERHANGERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
11.	PAINTERS PAPERHANGERS	Employment Information Series Counseling Section Ohio State Employment Service Ohio
12.	PAINTER APPRENTICE (CONSTRUCTION)	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California

PAINTER AND PAPERHANGER

	TITLE	ADDRESS
13.	PAINTING AND DECORATING CONTRACTING AS A CAREER	The Institute for Research Chicago, Illinois
14.	PAPERHANGER	Careers Largo, Florida
15.	PAPERHANGER	Chronicle Occupational Brief Service 25¢ Moravia, New York
16.	PRODUCTING PAINTER	Careers Largo, Florida

PLUMBER

TITLE	ADDRESS
1. CAREERS IN PLUMBING AND PLUMBING CONTRACTING	The Institute for Research Chicago, Illinois
2. CAREERS IN PLUMBING AND HEATING CONTRACTING	B'Nai B'Rith Vocational Service Bureau 1761 R Street, N.W. Washington, D.C.
3. FACING THE CRAFT CHALLENGES OF TOMORROW	International Training Fund United Association National Construction Agreement Washington, D.C.
4. FINDING OUT ABOUT PLUMBERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
5. GAS-MAIN FITTER	Washington State Occupational Guide Washington
6. NATIONAL PLUMBING APPRENTICESHIP STANDARDS	National Association of Plumbing Contractors 1016-20th Street, N.W. Washington, D.C.
7. NATIONAL STEAMFITTER PIPEFITTER APPRENTICESHIP STANDARDS	Mechanical Contractors Association of America, Inc. 666 Third Avenue (Suite 1464) New York 17, New York
8. PIPEFITTER (CONSTRUCTION)	State of New Jersey Department of Labor and Industry Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
9. PLUMBING OCCUPATIONS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
10. PLUMBER APPRENTICE	Job Guide Island of Oahu Department of Labor and Industrial Relations Bureau of Employment Security Honolulu, Hawaii

11.	PLUMBER PLUMBER APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area with Solano County California
12.	PLUMBER	Chronicle Occupational Brief Service Moravia, New York 25¢
13.	PLUMBER (CONSTRUCTION)	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
14.	PLUMBER	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
15.	PLUMBER-PIPEFITTER	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
16.	PLUMBER AND STEAMFITTER APPRENTICE (CONSTRUCTION)	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
17.	PLUMBERS AND PIPEFITTERS	Careers Largo, Florida
18.	PLUMBERS AND PIPEFITTERS	National Association of Plumbing-Heating-Cooling Contractors 1016 20th Street, N.W. Washington, D. C. 20036
19.	PLUMBERS AND PIPE FITTERS	Employment Information Series Counseling Section Ohio State Employment Service Ohio
20.	PLUMBERS AND PIPEFITTERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
21.	STEAM & PIPE FITTERS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202

	TITLE	ADDRESS
22.	STEAMFITTERS, PIPEFITTERS AND PLUMBERS	Chronicle Occupational Brief Service Moravia, New York 35¢
23.	YOUR FUTURE IN PLUMBING AND HEATING	National Association of Plumbing Contractors 1016 20th Street, N.W. Washington, D.C.

POLICEMAN

	TITLE	ADDRESS
1.	APPLICATION FOR FEDERAL EMPLOYMENT	Washington, D.C.
2.	ARCO COURSE: LAW ENFORCEMENT POSITIONS	ARCO Publishing Company, Inc. 219 Park Avenue South New York, New York 10003
3.	POLICEMAN	Washington State Occupational Guide Washington
4.	CORRECTIONAL OFFICER	Occupational Guide State of California Department of Employment State of California
5.	EMPLOYMENT OUTLOOK FOR FBI AGENTS	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402
6.	EMPLOYMENT OUTLOOK FOR FIREFIGHTERS, POLICEMEN AND POLICEWOMEN	Superintendent of Documents Washington, D.C. 20402
7.	FINDING OUT ABOUT POLICEWOMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
8.	HIGHWAY PATROLMAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
9.	METROPOLITAN POLICE DEPARTMENT AND CAN YOU QUALIFY	Recruiting Bureau Room No. 6068, Municipal Center 300 Indiana Avenue, N.W. Washington, D.C. 20001
10.	PATROLMAN	Washington State Occupational Guide Washington
11.	POLICE	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
12.	POLICE OFFICERS	Job Brief Michigan Employment Security Comm. 7310 Woodward, Detroit, Michigan 48202

	TITLE	ADDRESS
13.	POLICE OFFICERS	Michigan Employment Security Comm. United States Employment Service 7310 Woodward Avenue Detroit, Michigan 48202
14.	POLICE SERIES	United States Civil Service Commission Qualification Standards Washington, D.C.
15.	POLICE WORK AND CRIME PREVENTION AS A CAREER	The Institute for Research Chicago, Illinois
16.	POLICEMAN	Careers Largo, Florida
17.	POLICEMAN	Job Information Florida State Employment Service Tallahassee, Florida
18.	POLICEMAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
19.	POLICEMAN	Occupational Guide Division of Employment Security Greater St. Louis Area Missouri
20.	POLICEMAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
21.	POLICEMAN	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
22.	CORRECTION OFFICER	Washington State Occupational Guide
23.	POLICEMAN AND DEPUTY SHERIFF	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Area California
24.	PROTECTIVE SERVICE WORKERS	Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah

	TITLE	ADDRESS
25.	REQUIREMENTS FOR A POLICE CAREER	International Association of Chiefs of Police, Inc. 1319 18th Street, N.W. Washington, D.C. 20036
26.	SECURITY OFFICER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Area California
27.	SHOULD YOU GO INTO LAW ENFORCEMENT?	Career Information Service New York Life Insurance Company Box 51, Madison Square Station New York, New York 10010
28.	STATE POLICEMAN: GUARDIAN OF THE HIGHWAYS	Reprint from: Occupational Outlook Quarterly U. S. Government Printing Office Washington, D.C.
29.	STATE TRAFFIC OFFICER (THE CALIFORNIA HIGHWAY PATROLMAN)	Occupational Guide State of California Department of Employment State of California
30.	WANTED . . . POLICEMEN AT $6,010 A YEAR	Civil Service Commission Washington, D.C. 20415

POST OFFICE CLERK

	TITLE	ADDRESS
1.	AN INTRODUCTION TO THE FEDERAL CIVIL SERVICE	Division of Guidance and Testing State Department of Education 751 Northwest Boulevard Columbus, Ohio 43212
2.	EMPLOYMENT OUTLOOK IN POST OFFICE OCCUPATIONS (1963-64)	United Federation of Postal Clerks Federation Building 817 Fourteenth Street, N.W. Washington 5, D.C.
3.	EMPLOYMENT OUTLOOK IN POST OFFICE OCCUPATIONS	Superintendent of Documents Washington, D.C. 20402
4.	FINDING OUT ABOUT POSTAL CLERKS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
5.	MAIL CARRIER	Occupational Guide State of California Department of Employment State of California
6.	MAIL CARRIER (FEDERAL GOVERNMENT)	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
7.	MAIL CARRIER	Employment Information Series Counseling Section Ohio State Employment Service Ohio
8.	POST OFFICE CLERK	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
9.	POST-OFFICE CLERK	Employment Information Series Counseling Section Ohio State Employment Service Ohio

	TITLE	ADDRESS
10.	POST-OFFICE CLERKS (FEDERAL GOVERNMENT)	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
11.	POSTAL CLERKS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
12.	POSTAL EMPLOYEES	Chronicle Occupational Brief Service Moravia, New York 35¢
13.	POSTAL FIELD SERVICE	Examining Guide Substitute Clerk-Carrier PFS-4 Federation Building Washington, D.C.
14.	U. S. POST OFFICE DEPARTMENT	The Institute for Research Chicago, Illinois
15.	WORKING FOR THE U.S.A.	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402

PRINTER

	TITLE	ADDRESS
1.	A CAREER IN TYPOGRAPHY TODAY	International Typographic Composition Association 2233 Wisconsin Avenue, N.W. Washington, D. C. 20007
2.	A SURVEY OF PRINTING COLLEGES	Jerrold A. Nieminen Assistant Professor School of Technology Purdue University Indiana
3.	AFTER GRADUATION . . .WHAT?	New York Mergenthaler Linotype School 224 West 23 Street New York 11, New York
4.	CAREER AS A PRINTER THE PRINTING BUSINESS	The Institute for Research Chicago, Illinois
5.	CAREER OPPORTUNITIES IN GRAPHIC COMMUNICATIONS	Admissions Office Carnegie Tech. 5000 Forbes Avenue Pittsburgh, Pennsylvania 15213
6.	CAREER OPPORTUNITIES IN PRINTING (COPY PREPARATION)	Educational Council of the Graphic Arts Industry 1411 K Street, N.W. Washington 5, D.C.
7.	CAREER OPPORTUNITIES IN PRINTING (PHOTOMECHANICS)	Educational Council of the Graphic Arts Industry 1411 K Street, N.W. Washington 5, D.C.
8.	CAREER OPPORTUNITIES IN PRINTING (COPY PREPARATION)	Educational Council of the Graphic Arts Industry 1411 K Street, N.W. Washington 5, D.C.
9.	CAREER OPPORTUNITIES IN PRINTING (THE PRESSROOM AND BINDERY)	Educational Council of the Graphic Arts Industry 1411 K Street, N.W. Washington 5, D.C.
10.	CAREER OPPORTUNITIES IN THE PRINTING INDUSTRY	Heidelbert Eastern, Inc. 73-45 Woodhaven Boulevard Glendale, New York 11227

	TITLE	ADDRESS
11.	CAREERS IN PRINTING	Rochester Institute of Technology Rochester, New York
12.	COMMERCIAL PRESSMAN (LETTERPRESS)	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
13.	COMPOSING-ROOM OCCUPATIONS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
14.	COMPOSITOR	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
15.	COMPOSITORS AND PRINTING PRESSMEN	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
16.	ELECTROTYPER	Careers Largo, Florida
17.	EMPLOYMENT OUTLOOK IN PRINTING OCCUPATIONS	Superintendent of Documents Washington, D.C. 20402
18.	FINDING OUT ABOUT COMPOSITORS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
19.	FINDING OUT ABOUT OFFSET LITHOGRAPHERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
20.	FINDING OUT ABOUT PHOTOENGRAVERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
21.	IMPACT OF WEB OFFSET	Lithographers and Photoengravers International Union 233 West 49th Street New York, New York 10019

	TITLE	ADDRESS
22.	JOB PRINTING PRESSMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
23.	JOBS IN THE PRINTING TRADE	Careers Largo, Florida
24.	LAYOUT MAN (PRINTING)	Careers Largo, Florida
25.	LINOTYPE OPERATOR	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Orange County Area California
26.	LINOTYPE OPERATOR	Careers Largo, Florida
27.	LINOTYPE OPERATOR	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
28.	LITHO LENS	National Association of Photo-Lithographers 230 West 41st Street New York, New York 10036
29.	LITHOGRAPHIC OCCUPATIONS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
30.	LITHOGRAPHIC-PRESS PLATEMAKER	Careers Largo, Florida
31.	LUDLOW AND MAKE-UP	Manhattan Schools of Printing 333 Avenue of the Americas (Sixth Ave. at West 4th St.) New York 14, New York
32.	MANHATTAN SCHOOL OF PRINTING	Manhattan School of Printing 88 West Broadway New York 7, New York
33.	MODERN LITHOGRAPHY	By P. K. Thomajan Modern Lithography, July , 1965

TITLE	ADDRESS
34. MODERN PRINTING	International Typographic Union P. O. Box 157 301 South Union Boulevard Colorado Springs, Colorado
35. NATIONAL SCHOLARSHIP PROGRAM OF THE PRINTING AND PUBLISHING INDUSTRY	National Scholarship Trust Fund of the Educational Council of the Graphic Arts Industry 4615 Forbes Avenue Pittsburgh, Pennsylvania 15213
36. NEW DARKROOM COURSE STARTED	ITU Training Center Topics April, 1962
37. OFFSET LITHOGRAPHERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
38. OFFSET PRESSMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
39. PHOTOCOMPOSITION PROOFING MATERIALS	ITU Training Center Topics January, 1960
40. PHOTOENGRAVER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Orange County Area California
41. PHOTOENGRAVER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
42. PHOTOENGRAVER (RELIEF PRINTING)	Careers Largo, Florida 15¢
43. PHOTOENGRAVERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
44. PHOTOENGRAVING OCCUPATIONS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202

	TITLE	ADDRESS
45.	PHOTOLITHOGRAPHER	Chronicle Occupational Brief Service Moravia, New York 35¢
46.	PRINTING INDUSTRY	Employment Information Series Counseling Section Ohio State Employment Service Ohio
47.	PRINTING PRESSMAN	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
48.	PRINTING PRESSMEN	Michigan Employment Security Comm. 7310 Woodward Avenue Detorit, Michigan 48202
49.	PRINTING PRESSMEN AND ASSISTANTS	Occupational Guide Division of Employment Security Missouri
50.	PRINTING: THE CHALLENGING CAREER	PS Herald Champion Papers Inc. One East Wacker Drive Chicago, Illinois 60601
51.	SCREEN PROCESS PRINTING	Manhattan School of Printing 88 West Broadway New York, New York
52.	SHOULD YOU GO INTO THE PRINTING INDUSTRY?	Career Information Service New York Life Insurance Company Box 51, Madison Square Station New York, New York 10010
53.	STEROTYPERS & ELECTROTYPERS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
54.	TECHNOLOGICAL DEVELOPMENTS IN THE GRAPHIC ARTS	Lithographers and Photoengravers International Union 233 West 49th Street New York, New York 10019
55.	THE ITU TRAINING CENTER	International Typographical Union

	TITLE	ADDRESS
56.	THIS IS A PRINTING OFFICE	Education Council of the Graphic Arts Industry 1411 K Street N.W. Washington 5, D.C.
57.	TRAINING COURSE IN GRAPHIC REPRODUCTIONS	Society of Reproduction Engineers 18465 James Couzens Highway Detroit, Michigan 48235
58.	YOUR CAREER BEGINS AT MANHATTAN SCHOOL OF PRINTING	Manhattan School of Printing 88 West Broadway New York 7, New York
59.	YOUR CAREER IN LITHOGRAPHY	National Association of Photo-Lithographers 230 West 41st Street New York, New York 10036
60.	YOUR CAREER IN PRINTING	New York Employing Printers Association, Inc. 461 Eighth Avenue New York 1, New York
61.	YOUR CAREER IN PRINTING LITHOGRAPHER	Manhattan Schools of Printing 88 West Broadway Corner Chambers Street New York 7, New York

RADIO AND TV SERVICEMAN

	TITLE	ADDRESS
1.	CAREERS IN TELEVISION	The Institute for Research Chicago, Illinois
2.	CHARLEY THE TV REPAIRMAN	McGraw-Hill Book Company New York, New York
3.	DE VRY TECH'S CHICAGO RESIDENT SCHOOL	4141 Belmont Avenue Chicago, Illinois 60641
4.	EMPLOYMENT OUTLOOK FOR TELEVISION AND RADIO TECHNICIANS	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402 5¢
5.	EMPLOYMENT OUTLOOK FOR TELEVISION AND RADIO SERVICEMEN	Superintendent of Documents U. S. Government Printing Office Washington 25, D.C. 5¢
6.	FINDING OUT ABOUT RADIO AND TELEVISION SERVICEMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
7.	OCCUPATIONAL GUIDE FOR TELEVISION AND RADIO REPAIRMAN	Employment Security Department of South Dakota Sioux Falls, South Dakota
8.	RADIO REPAIRMAN	Personnel Services, Inc. Sydney F. Austin, Editor P. O. Box 306 Jaffrey, New Hampshire
9.	RADIO-TV REPAIRMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
10.	RADIO AND TELEVISION SERVICE AND REPAIRMAN	Careers Largo, Florida
11.	RADIO AND TELEVISION SERVICEMAN	Occupational Guide State of California Department of Employment San Francisco Bay Area California
12.	RADIO & TV SERVICEMEN	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202

RADIO AND TV SERVICEMAN (Continued)

	TITLE	ADDRESS
13.	RADIO-TV SERVICEMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
14.	RADIO AND TELEVISION SERVICEMEN	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
15.	RADIO AND TELEVISION TECHNICIAN	Careers Largo, Florida
16.	TELEVISION AND RADIO REPAIRMAN	Job Information Florida State Employment Service Tallahassee, Florida
17.	TELEVISION AND RADIO TECHNICIAN, SERVICEMAN, AND SERVICE MANAGER	The Institute for Research Chicago, Illinois
18.	TELEVISION SERVICE AND REPAIRMAN	Occupational Guide Department of Employment State of Idaho P. O. Box 520 Boise, Idaho 83701
19.	TELEVISION SERVICE & REPAIRMAN	Occupational Guide Mississippi Employment Security Commission Jackson, Mississippi
20.	TELEVISION SERVICE AND REPAIRMAN AND RADIO REPAIRMAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
21.	TELEVISION SERVICE AND REPAIRMAN	Washington State Occupational Guide Washington

AIR CONDITIONING AND REFRIGERATION MECHANIC

	TITLE	ADDRESS
1.	AIR CONDITIONING AND HEATING TECHNOLOGY	Chronicle Occupational Brief Service Moravia, New York 35¢
2.	AIR-CONDITIONING AND REFRIGERATION MECHANICS	Occupational Outlook Handbook
3.	AIR-CONDITIONING TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
4.	AIR CONDITIONING TECHNICIAN	Careers Largo, Florida
5.	CAREER AS AN AIR CONDITIONING ENGINEER AND AS AN AIR CONDITIONING TECHNICIAN	The Institute for Research Chicago, Illinois
6.	ELECTRIC REGRIGERATOR SERVICEMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
7.	HEATING, AIR-CONDITIONING AND REFRIGERATION MECHANIC AND/OR SERVICEMAN	Chronicle Occupational Brief Service Moravia, New York 25¢
8.	HEATING AND REFRIGERATION MECHANICS	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
9.	OCCUPATIONAL GUIDE FOR REFRIGERATION/ AIR CONDITIONING SERVICE ENGINEERS	Refrigeration Service Engineers Society 433 N. Waller Avenue Chicago, Illinois 60644
10.	REFRIGERATION AIR-CONDITIONING MECHANIC	Job Information Florida State Employment Service Tallahassee, Florida
11.	REFRIGERATION AND AIR CONDITIONING MECHANIC	Employment Information Series Counseling Section Ohio State Employment Service Ohio
12.	REFRIGERATION MECHANIC	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California

	TITLE	ADDRESS
13.	REFRIGERATION MECHANIC	Chronicle Occupational Brief Service Moravia, New York 35¢
14.	REFRIGERATION MECHANIC	Careers Largo, Florida
15.	YOUR FUTURE IN THE AIR-CONDITIONING AND REFRIGERATION INDUSTRY	Air-Conditioning and Refrigeration Institute 1815 North Fort Myer Drive Arlington, Virginia 22209

ROOFER

	TITLE	ADDRESS
1.	FINDING OUT ABOUT ROOFERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
2.	ROOFER	Careers Largo, Florida
3.	ROOFER WATERPROOFER	Employment Information Series Counseling Section Ohio State Employment Service Ohio
4.	ROOFERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
5.	ROOFERS (WOOD AND OTHER MATERIALS)	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah

SURVEYOR

	TITLE	ADDRESS
1.	AMERICAN CONGRESS ON SURVEYING AND MAPPING CAREER INQUIRIES	Publication Lists
2.	AMERICA'S FUTURE BELONGS TO THE CIVIL ENGINEER	Ohio Contractors Association Cleveland, Ohio
3.	CIVIL AND HIGHWAY TECHNOLOGY	United States Government Printing Office Division of Public Documents Washington, D.C. 20402
4.	COMPARISON AND COMPILATION OF STATE REGISTRATION REQUIREMENTS CONCERNED WITH THE "PROFESSION OF LAND SURVEYING"	Reprint from <u>Surveying and Mapping</u>
5.	FINDING OUT ABOUT SURVEYORS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
6.	PROFESSIONAL PRACTICE OF SURVEYING AND MAPPING WITHIN CIVIL ENGINEERING	Headquarters of the Society United Engineering Center 345 East 47th Street New York, New York 10017
7.	REGISTRATION ACT FOR ARCHITECTS, PROFESSIONAL ENGINEERS AND LAND SURVEYORS	State of Michigan Department of Licensing and Regulation 200 Lafayette Building Detroit, Michigan 48226
8.	ROD AND CHAINMAN	Occupational Guide State of California Department of Employment San Francisco Bay Area California
9.	RODMAN & CHAINMAN (SURVEYING)	Careers Largo, Florida
10.	SURVEYING AND MAPPING DIVISION	Part of the copyrighted Journal of the Surveying and Mapping Division.
11.	SURVEYING	Chronicle Occupational Brief Service Moravia, New York 35¢
12.	SURVEYOR	Careers Largo, Florida

TITLE	ADDRESS
13. SURVEYOR - CHIEF OF PARTY	Occupational Guide State of California Department of Employment San Francisco Bay Area California
14. SURVEYOR	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
15. SURVEYOR	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
16. SURVEYORS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
17. THE LAND SURVEYOR OF THE FUTURE	ASCM Central Office Room 430 Woodward Bldg. 733 15th Street, N.W. Washington, D.C. 20005

TELEPHONE INSTALLER

	TITLE	ADDRESS
1.	CAREER AS A COMMUNICATIONS ENGINEER AND AS A TECHNICIAN, IN TELEPHONE, TELEGRAPH, RADIO, AND TELEVISION WORK	The Institute for Research Chicago, Illinois
2.	EMPLOYMENT OUTLOOK IN TELEPHONE OCCUPATIONS	Superintendent of Documents Washington, D. C. 20402
3.	FINDING OUT ABOUT TELEPHONE INSTALLERS	Science Research Associates, Inc. 259 East Erie Street Chicago II, Illinois
4.	LINEMEN AND CABLE SPLICERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
5.	STATION INSTALLER II	Job Information Florida State Employment Service Tallahassee, Florida
6.	STATION INSTALLER	Employment Information Series Counseling Section Ohio State Employment Service Ohio
7.	TELEPHONE INSTALLER	Careers Largo, Florida

TOOL AND DIE MAKER

	TITLE	ADDRESS
1.	A GUIDE TO EXCELLENCE	Prepared by the Tool & Die Institute
2.	APPRENTICESHIP AND TRAINING IN THE CONTRACT TOOL AND DIE INDUSTRY	Mr. Robbin R. Hough Division of Research Bureau of Apprenticeship and Training Washington, D.C.
3.	DIE MAKER (MACHINE SHOP)	Careers Largo, Florida
4.	FINDING OUT ABOUT TOOL AND DIE MAKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
5.	TOOL AND CUTTER GRINDER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
6.	TOOLMAKER	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
7.	TOOL MAKER	Careers Largo, Florida
8.	RECOMMENDED COURSE OF STUDY FOR A CAREER AS A TOOL & DIE OR MOLD APPRENTICE	Mimeographed paper
9.	TOOL AND DIE INSTITUTE APPRENTICE TRAINING COURSES	The Tool and Die Institute The Vocational and Practical Arts Education Chicago Public School and School District 214 Chicago, Illinois
10.	TOOL AND DIE MAKER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California

	TITLE	ADDRESS
11.	TOOL AND DIE MAKER	Chronicle Occupational Brief Service Moravia, New York
12.	TOOL AND DIE MAKER	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
13.	TOOL AND DIE MAKER	Kansas State Employment Service 402 E. 2nd Wichita, Kansas
14.	TOOL AND DIE MAKER	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
15.	TOOL AND DIE MAKER	Employment Information Series Counseling Section Ohio State Employment Service Ohio
16.	TOOL AND DIE MAKERS	Machining Occupations Occupational Outlook Handbook
17.	TOOL AND DIE MAKERS	Michigan Employment Security Comm. Employment Service Division 7310 Woodward Avenue Detroit, Michigan 48202
18.	TOOL AND DIE MAKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611

TOOL DESIGNER

	TITLE	ADDRESS
1.	CAREERS IN INDUSTRIAL DESIGN	Ronald R. Darling, Director Career Information Center Northeastern University Boston, Massachusetts
2.	INDUSTRIAL DESIGNER	Careers Largo, Florida
3.	TOOL DESIGNER	Careers Largo, Florida
4.	TOOL DESIGNER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California

TRUCK DRIVER

	TITLE	ADDRESS
1.	ANATOMY OF A TRUCKING FIRM	The Highway User (Reprinted by:) American Truck Associations, Inc. 1616 P Street, N.W. Washington, D.C.
2.	CAREERS IN TRUCK TRANSPORTATION	The Institute for Research Chicago, Illinois
3.	EMPLOYMENT OUTLOOK IN DRIVING OCCUPATIONS	Education Section Public Relations Department American Trucking Associations, Inc. 1616 P Street, N.W. Washington, D.C. 20036
4.	FINDING OUT ABOUT LONG-DISTANCE TRUCK DRIVERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
5.	FINDING OUT ABOUT POWER TRUCK DRIVERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
6.	GETTING INTO THE FOR-HIRE TRUCKING INDUSTRY	American Trucking Associations, Inc. 1616 P Street, N.W. Washington, D.C. 20036
7.	HEAVY-TRUCK DRIVER	Careers Largo, Florida
8.	LONG-DISTANCE TRUCK AND BUS DRIVERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
9.	LONG-HAUL TRUCK DRIVER	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
10.	MOTOR-VEHICLE OPERATOR	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
11.	TRUCK DRIVER SCHOOL	North Carolina State of the University of North Carolina at Raleigh Division of General Extension P. O. Box 5125 Raleigh, North Carolina

	TITLE	ADDRESS
12.	OPPORTUNITIES IN THE TRUCKING INDUSTRY	American Trucking Associations, Inc. Washington, D.C.
13.	POWER TRUCK OPERATORS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
14.	ROUTEMAN	Careers Largo, Florida
15.	ROUTEMAN	Chronicle Occupational Brief Service Moravia, New York 35¢
16.	ROUTEMAN	Employment Information Series Counseling Section Ohio State Employment Service Ohio
17.	SCHOLARSHIP PROGRAMS OF MOTOR CARRIER COMPANIES AND ASSOCIATIONS	American Trucking Associations, Inc. Washington, D.C. 20036
18.	THE CHANGING IMAGE OF THE TRUCK DRIVER	ATA Foundation 1616 P Street, N.W. Washington 6, D.C.
19.	THE TRUCK DRIVER	The Instructor (Reprinted by:) Public Relations Department American Trucking Association, Inc. 1616 P Street, N.W. Washington, D.C. 20036
20.	TRACTOR-TRAILER-TRUCK DRIVER	Washington State Occupational Guide Washington
21.	TRAILER-TRUCK DRIVER	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
22.	TRAILER TRUCK DRIVER	Employment Information Series Counseling Section Ohio State Employment Service Ohio

	TITLE	ADDRESS
23.	TRANSPORTATION COURSES IN U.S. COLLEGES AND UNIVERSITIES	Education Section Public Relations Department American Trucking Associations, Inc. 1616 P Street, N.W. Washington, D.C. 20036
24.	TRUCKDRIVER (LOCAL)	Employment Information Series Counseling Section Ohio State Employment Service Ohio
25.	TRUCK DRIVER	Chronicle Occupational Brief Service Moravia, New York 25¢
26.	TRUCK DRIVERS	Job Brief Michigan Employment Security Comm. 7310 Woodward Detroit, Michigan 48202
27.	TRUCK DRIVERS	Occupational Guide Greater St. Louis Area Division of Employment Security Missouri
28.	TRUCK DRIVER TRAINING	Coordinator of Truck Driver Program Lansing Community College 419 N. Capitol Avenue Lansing, Michigan 48914
29.	TRUCK TRANSPORTATION IN MICHIGAN	Michigan Trucking Association 440 Stoddard Building Lansing, Michigan
30.	YOUR FUTURE IN HIGHWAY TRANSPORTATION	Regular Common Carrier Conference, ATA 1616 P Street, N.W. Washington 6, D.C.

AIR TRAFFIC CONTROL SPECIALIST

	TITLE	ADDRESS
1.	AIR TRAFFIC CONTROL SPECIALIST	Occupational Guide Department of Employment State of California Los Angeles-Long Beach Area California
2.	THE DISPATCHER	Air Line Dispatchers Association 243 W. Maple Avenue Vienna, Virginia 22180

AUTOMOBILE SALESMAN

	TITLE	ADDRESS
1.	CAREERS IN AUTOMOBILE DEALERSHIPS	The Institute for Research Chicago, Illinois
2.	EMPLOYMENT OUTLOOK FOR AUTOMOTIVE SERVICE AND SALES	Superintendent of Documents Washington, D.C. 20402
3.	FACTS FOR THE GUIDANCE COUNSELOR ADVISING STUDENTS ON CAREERS IN THE RETAIL AUTOMOTIVE BUSINESS	General Motors Corporation
4.	THE RETAIL AUTOMOBILE BUSINESS	General Motors Corporation
5.	YOUR CAREER IN THE RETAIL AUTOMOBILE INDUSTRY	National Automobile Dealers Association (Copyright) 2000 K Street, N.W. Washington, D.C. 20006

BAKER

	TITLE	ADDRESS
1.	ATBI HANDBOOK ON BAKING SCHOOLS AND SCHOLARSHIPS	Allied Trades of the Baking Industry, Inc. 625 Madison Avenue New York 22, New York
2.	BAKER	Careers Largo, Florida
3.	BAKER	Chronicle Occupational Briefs Moravia, New York 25¢
4.	BAKER	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
5.	BAKERS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
6.	BAKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
7.	BAKERS	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
8.	BAKING INDUSTRY	Employment Information Series Counseling Section Ohio State Employment Service Bureau of Unemployment Compensation Ohio
9.	EMPLOYMENT OUTLOOK IN BAKING INDUSTRY	Superintendent of Documents Washington, D.C. 20402
0.	FINDING OUT ABOUT BAKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
1.	OVENMAN-BAKER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111

	TITLE	ADDRESS
12.	SCHOOL OF BAKING	American Institute of Baking 400 East Ontario Street Chicago, Illinois 60611
13.	THERE'S A FUTURE FOR YOU IN THE BAKING INDUSTRY	American Bakers Association 20 North Wacker Drive Chicago, Illinois 60606

BOILERMAKER

	TITLE	ADDRESS
1.	BOILERMAKER	Careers Largo, Florida
2.	BOILERMAKER	Chronicle Occupational Briefs Moravia, New York 35¢
3.	BOILERMAKERS	Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
4.	BOILERMAKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
5.	BOILERMAKER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
6.	FINDING OUT ABOUT BOILERMAKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
7.	MINIMUM STANDARDS OF APPRENTICESHIP FOR BOILERMAKER (FIELD ERECTION AND REPAIR)	Boiler Makers Local 169 2988 East Grand Boulevard Room 110 Detroit 2, Michigan

BUILDING MAINTENANCE

	TITLE	ADDRESS
1.	APARTMENT HOUSE JANITORS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
2.	BUILDING INSPECTOR	Careers Largo, Florida
3.	BUILDING SERVICE WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
4.	CUSTODIAN	Chronicle Occupational Briefs Moravia, New York 25¢
5.	FINDING OUT ABOUT APARTMENT BUILDING MANAGERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
6.	FINDING OUT ABOUT BUILDING SERVICE WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
7.	GROUNDS KEEPER (ANY IND.)	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
8.	GUARD	Occupational Guide State of California Department of Employment San Francisco Bay Area California
9.	HOUSEKEEPER (EXECUTIVE)	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
10.	JANITOR (PORTER)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
11.	JANITOR	Kansas State Employment Service 552 State Avenue Kansas City, Kansas
12.	JANITOR	Careers Largo, Florida

TITLE	ADDRESS
13. STATIONARY ENGINEERS	Other Trades and Manual Occupations Occupational Outlook Handbook
14. SCHOOL CUSTODIAN (JANITOR)	Careers Largo, Florida

BUS DRIVER

	TITLE	ADDRESS
1.	BUS DRIVER	Chronicle Occupational Briefs Moravia, New York 35¢
2.	BUS DRIVER	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
3.	BUS DRIVER (CITY)	Washington State Occupational Guide Washington
4.	BUS FACTS	National Association of Motor Bus Owners 839-17th Street N.W. Washington, D.C. 20006
5.	FINDING OUT ABOUT LOCAL BUS DRIVERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
6.	FINDING OUT ABOUT LONG-DISTANCE BUS DRIVERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
7.	LOCAL BUS DRIVERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611

BUTCHER

	TITLE	ADDRESS
1.	BUTCHER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111

CONCRETE FINISHER

	TITLE	ADDRESS
1.	CEMENT AND CONCRETE FINISHERS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
2.	CEMENT FINISHER	Job Information Florida State Employment Service Tallahassee, Florida
3.	CEMENT FINISHERS	The Associated General Contractors of America, Inc. 1957 E Street, N.W. Washington, D. C.
4.	CEMENT MASON	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California
5.	CEMENT MASON	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
6.	CEMENT MASONS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
7.	FINDING OUT ABOUT CEMENT MASONS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois

CRANE OPERATOR

	TITLE	ADDRESS
1.	CRANE AND HOIST OPERATORS	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111

DENTAL HYGIENIST

	TITLE	ADDRESS
1.	ACCREDITED DENTAL ASSISTANT PROGRAMS	American Dental Association Council on Dental Education 211 East Chicago Avenue Chicago, Illinois 60611
2.	ACCREDITED DENTAL HYGIENE PROGRAMS	American Dental Association Council on Dental Education 211 East Chicago Avenue Chicago, Illinois 60611
3.	ACCREDITED DENTAL LABORATORY TECHNOLOGY PROGRAMS	American Dental Association Council on Dental Education 211 East Chicago Avenue Chicao, Illinois 60611
4.	CAREER AS A DENTAL HYGIENIST	The Institute for Research Chicago, Illinois
5.	DENTAL ASSISTANT	Washington State Occupational Guide Washington
6.	DENTAL HYGIENIST	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
7.	CAREERS IN DENTAL HYGIENE	American Dental Hygienists' Association 211 East Chicago Avenue Chicago, Illinois 60611
8.	DENTAL HYGIENE APTITUDE TESTING PROGRAM	ADHA 211 East Chicago Avenue Chicago, Illinois 60611
9.	DENTAL HYGIENE APTITUDE TESTING PROGRAM	ADHA 211 East Chicago Avenue Chicago, Illinois 60611
10.	DENTAL HYGIENIST	Careers Largo, Florida
11.	DENTAL HYGIENISTS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611

	TITLE	ADDRESS
12.	FINDING OUT ABOUT DENTAL HYGIENISTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
13.	PROPOSED ORGANIZATION FOR DENTAL LABORATORIES AND EDUCATION PROGRAM	Mimeographed Sheet
14.	THE DENTAL HYGIENIST IN DENTAL PRACTICE	American Dental Association 211 East Chicago Avenue Chicago, Illinois 60611
15.	THE REGISTERED DENTAL HYGIENIST	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402
16.	THIS COULD BE YOU. . .A TRAINED DENTAL ASSISTANT	American Dental Assistants Association 211 E. Chicago Avenue Chicago, Illinois 60611

DENTAL LAB TECHNICIAN

	TITLE	ADDRESS
1.	ACCREDITED DENTAL LABORATORY TECHNOLOGY PROGRAM	American Dental Association Council on Dental Education 211 East Chicago Avenue Chicago, Illinois 60611
2.	AMERICAN FUND FOR DENTAL EDUCATION	American Fund for Dental Education 211 E. Chicago Avenue Chicago, Illinois 60611
3.	APPRENTICESHIP AND TRAINING POLICY FOR DENTAL LABORATORY TECHNICIANS	U. S. Department of Labor Bureau of Apprenticeship and Training Washington, D.C. 20210
4.	CAREER AS A DENTAL ASSISTANT	The Institute for Research Chicago, Illinois
5.	CAREER AS A DENTAL LABORATORY TECHNICIAN	The Institute for Research Chicago, Illinois
6.	DENTAL-LABORATORY TECHNICIAN	Chronicle Guidance Service Moravia, New York 35¢
7.	DENTAL-LABORATORY TECHNICIAN	Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
8.	DENTAL LABORATORY TECHNICIAN	Personnel Services, Inc. Sydney F. Austin, Editor P. O. Box 306 Jaffrey, New Hampshire
9.	DENTAL LABORATORY TECHNICIANS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
10.	DENTAL LABORATORY TECHNICIAN	Occupational Guide State of Missouri Division of Employment Security Missouri
11.	DENTAL LABORATORY TECHNICIAN	Washington State Occupational Guide Washington
12.	DENTAL LABORATORY TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
13.	DENTAL TECHNICIAN	Careers Largo, Florida

	TITLE	ADDRESS
14.	DENTAL TECHNICIAN	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
15.	EMPLOYMENT OUTLOOK FOR DENTAL LABORATORY TECHNICIANS	United States Department of Labor Bureau of Labor Statistics Washington, D.C.
16.	EMPLOYMENT OUTLOOK FOR DENTAL LABORATORY TECHNICIANS	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402
17.	FINDING OUT ABOUT DENTAL TECHNICIANS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
18.	HANDS THAT THINK	National Board for Certification 500 Walker Building 734 15th Street Washington, D.C. 20005

DRY CLEANER

	TITLE	ADDRESS
1.	CAREER AS DRY CLEANER AND SPOTTER	B'Nai B'Rith Vocational Service Bureau 1761 R Street N.W. Washington, D.C.
2.	CLEANING AND DYEING WORKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
3.	CLEANING AND PRESSING OCCUPATIONS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
4.	DRY CLEANER	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
5.	DRY CLEANER SPOTTER	Employment Information Series Ohio State Employment Service Ohio
6.	DRY CLEANER, PRESSER SPOTTER	Florida State Employment Service Tallahassee, Florida
7.	DRY CLEANER SPOTTER, GENERAL	Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
8.	DRYCLEANING JOBS	Careers Largo, Florida
9.	DRY CLEANING INDUSTRY	Employment Information Series Ohio State Employment Service Ohio
10.	DRY CLEANING OCCUPATIONS	Chronicle Occupational Briefs Moravia, New York 35¢
11.	EMPLOYMENT AND TRAINING GUIDE FOR THE LINEN SUPPLY INDUSTRY	Linen Supply Association of America 22 West Monroe Street Chicago 3, Illinois
12.	FINDING OUT ABOUT DRY-CLEANING WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois

	TITLE	ADDRESS
13.	HOUSEHOLD FINISHER-PRESSER	National Association of Manufacturers 277 Park Avenue New York, New York 10017
14.	MANAGEMENT CAREERS IN THE LAUNDRY AND DRY CLEANING BUSINESS	The Institute for Research Chicago, Illinois
15.	OPPORTUNITY AND A FUTURE IN THE DRYCLEANING INDUSTRY	National Institute of Drycleaning, Inc. 909 Burlington Avenue Silver Spring, Maryland 20910
16.	PRESSER	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
17.	PRESSER, MACHINE	Employment Information Series Ohio State Employment Service Ohio
18.	PRESSERS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
19.	ROUTEMAN	National Association of Manufacturers 277 Park Avenue New York, New York 10017
20.	SHIRT PRESSER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
21.	SPOTTER	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California

ELEVATOR REPAIRMAN

	TITLE	ADDRESS
1.	ELEVATOR INSTALLER, ELECTRIC (HYDRAULIC)	Employment Information Series Ohio State Employment Service Ohio

FIREMAN

	TITLE	ADDRESS
1.	A VALIANT CAREER	International Association of Fire Chiefs 232 Madison Avenue New York, New York 10016
2.	CAREERS IN FIRE DEPARTMENTS AND IN FIRE PREVENTION WORK	The Institute for Research Chicago, Illinois
3.	FINDING OUT ABOUT FIREMEN	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
4.	FIREMAN	Careers Largo, Florida
5.	FIRE FIGHTER	Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
6.	FIRE LOOKOUT	Washington State Occupational Guide Washington
7.	FIREMAN	Chronicle Occupational Briefs Moravia, New York 35¢
8.	FIREMAN	Employment Information Series Ohio State Employment Service Ohio
9.	FIREMEN	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
10.	FIREMAN, STATIONARY BOILER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
11.	FOREST FIREFIGHTER	Occupational Guide State of California Department of Employment State of California
12.	FOREST FIRE FIGHTER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah

TITLE	ADDRESS
13. MUNICIPAL FIRE FIGHTERS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
14. THE PROFESSIONAL FIRE FIGHTER	International Association of Firefighters 905 16th Street, N.W. Washington 6, D.C.

FLOOR LAYER

	TITLE	ADDRESS
1.	FLOOR COVERER	Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah
2.	FLOOR COVERING INSTALLER	Occupational Guide State of California Department of Employment San Francisco Bay Area California
3.	FLOOR COVERING INSTALLERS	Careers Largo, Florida
4.	FLOOR COVERING INSTALLERS	Occupational Briefs Science Research Associates 259 East Erie Street Chicago, Illinois 60611
5.	FLOOR LAYER	Careers Largo, Florida
6.	HARDWOOD FLOOR LAYER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
7.	TERRAZZO WORKER TERRAZZO-WORKER HELPER	Occupational Guide State of California Department of Employment San Francisco Bay Area California
8.	YOUR OPPORTUNITY AS A PROFESSIONAL FLOORING CRAFTSMAN	Armstrong Cork Company Bureau of Merchandising Lancaster, Pennsylvania 17604

FOUNDRY WORKER

	TITLE	ADDRESS
1.	CHIPPERS AND GRINDERS	Careers Largo, Florida
2.	CRUCIBLE MELTING HANDBOOK	Crucible Manufacturers' Association 11 West 42nd Street New York, New York
3.	EDUCATION. . .THE TOTAL SPECTRUM	Reprinted from: Modern Castings September, 1965
4.	ENGINEERING AND TECHNICAL CAREER OPPORTUNITIES IN THE CAST METALS INDUSTRY	The Foundry Educational Foundation 1138 Terminal Tower Cleveland 13, Ohio
5.	FOUNDRY EDUCATIONAL FOUNDATION	Terminal Tower Building Cleveland, Ohio 44113 Spring, 1966
6.	FINDING OUT ABOUT FOUNDRY WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
7.	FINDING OUT ABOUT MOLDERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
8.	FINDING OUT ABOUT PATTERNMAKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
9.	FOUNDRY INDUSTRY	Employment Information Series Ohio State Employment Service Ohio
10.	FOUNDRY WORKERS	Occupation Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
11.	FOUNDRYMAN (MOLDER)	Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
12.	FOUNDRY OCCUPATIONS	Careers Largo, Florida
13.	GET THE MOST FROM CRUCIBLE MELTING	Crucible Manufacturer's Association 271 North Avenue New Rochelle, New York

	TITLE	ADDRESS
14.	INTERNATIONAL MOLDERS AND ALLIED WORKERS UNION	Mimeographed Reprint
15.	MACHINE MOLDER	Employment Information Series Ohio State Employment Service Ohio
16.	METAL PATTERNMAKER	Careers Largo, Florida
17.	MOLDER	Careers Largo, Florida
18.	MOLDER	Chronicle Occupational Briefs Chronicle Guidance Publications, Inc. Moravia, New York 35¢
19.	MOLDER AND COREMAKER (FOUNDRY)	Occupational Guide State of California Department of Employment Los Angeles-Long Beach-Orange County Area California
20.	PATTERNMAKER	Chronicle Occupational Briefs Chronicle Guidance Service Moravia, New York 35¢
21.	PATTERNMAKER	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
22.	PATTERNMAKERS	Michigan Employment Security Commission 7310 Woodward Avenue Detroit 2, Michigan
23.	PATTERNMAKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
24.	THE FOUNDRY EDUCATIONAL FOUNDATION	Information Sheet
25.	YOUR FUTURE IN THE METAL CASTINGS INDUSTRY	The American Foundrymens Society Golf and Wolf Roads Des Plaines, Illinois 60016

FURNITURE UPHOLSTERER

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1.	EXHIBITORS' SERVICE KIT	Freeman Decorating Co. 1300 Wycliff Avenue Dallas, Texas 75207
2.	FINDING OUT ABOUT UPHOLSTERERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
3.	FURNITURE FINISHER	Careers Largo, Florida
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5.	FURNITURE MANUFACTURING OCCUPATIONS	Chronicle Occupational Briefs Moravia, New York 35¢
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14.	UPHOLSTERERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611

GLAZIER

	TITLE	ADDRESS
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3.	GLASS MANUFACTURING WORKERS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
4.	GLAZIER (CONSTRUCTION)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
5.	GLAZIER	Careers Largo, Florida
6.	GLAZIER	Michigan Employment Security Commission 7310 Woodward Avenue Detroit, Michigan 48202
7.	GLAZIER	Employment Information Series Ohio State Employment Service Ohio
8.	GLAZIER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City 10, Utah
9.	GLAZIER, CONSTRUCTION	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
10.	NATIONAL APPRENTICSHIP AND TRAINING STANDARDS FOR GLAZIERS AND GLASS - WORKERS	U. S. Department of Labor Bureau of Apprenticeship and Training Washington, D.C.
11.	RELATED INSTRUCTION FOR APPRENTICES IN GLAZING	Glaziers Local Union 252 1522 W. Girard Avenue Philadelphia, Pennsylvania

	TITLE	ADDRESS
12.	RELATED INSTRUCTION FOR APPRENTICES IN GLAZING	Glaziers Local Union 252 1522 W. Girard Avenue Philadelphia, Pennsylvania

GUNSMITH

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1.	GUNSMITH	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California

VOCATIONAL INDUSTRIAL TEACHER

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1.	SHOULD YOU BE A TEACHER?	Career Information Service New York Life Insurance Company Box 51, Madison Square Station New York, New York 10010
2.	TEACHER, HIGH SCHOOL	Careers Largo, Florida
3.	TECHNICAL EDUCATION	Chronicle Occupational Briefs Moravia, New York 35¢
4.	TRADE AND TECHNICAL TEACHERS	Occupational Guide State of California Department of Employment Orange County California
5.	TRADE AND VOCATIONAL TEACHING AS A CAREER	The Institute for Research Chicago, Illinois
6.	VOCATIONAL BUSINESS EDUCATION TEACHER	Occupational Guide State of California Department of Employment Orange County California
7.	VOCATIONAL COUNSELOR	Occupational Guide Department of Employment State of California Southern California
8.	VOCATIONAL REHABILITATION COUNSELORS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
9.	VOCATIONAL TEACHER	Chronicle Occupational Briefs Moravia, New York 35¢

INDUSTRIAL X-RAY OPERATOR

	TITLE	ADDRESS
1.	BE A RADIOLOGIC TECHNOLOGIST	The American Society of Radiologic Technologists 537 South Main Street Fond du Lac, Wisconsin 54935
2.	INDUSTRIAL X-RAY TECHNICIAN	Careers Largo, Florida
3.	RADIOGRAPHER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach Orange County Area California

INSTRUMENT REPAIRMAN

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1.	EMPLOYMENT OUTLOOK FOR WATCH REPAIRMAN JEWELERS AND JEWELRY REPAIRMEN INSTRUMENT REPAIRMAN	Superintendent of Documents Washington, D. C.
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7.	INSTRUMENT REPAIRMEN	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
8.	INSTRUMENT REPAIRMEN	Mechanics and Repairmen Occupational Outlook Handbook
9.	INSTRUMENT SERVICEMAN	Occupational Guide State of California Department of Employment Sacramento-San Joaquin Valley Area California
10.	INSTRUMENTATION TECHNICIAN	Careers Largo, Florida

LATHE OPERATOR

	TITLE	ADDRESS
1.	LATHE OPERATOR, AUTOMATIC (MACHINE SHOP)	Careers Largo, Florida
2.	LATHER, METAL AND WOOD	Employment Information Series Ohio State Employment Service Ohio
3.	MACHINE TOOL OPERATOR	Occupational Guide State of California Department of Employment San Francisco Bay Area California
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5.	MACHINE TOOL OPERATORS	Careers Largo, Florida
6.	SEMI-SKILLED MACHINE TOOL OPERATOR	Chronicle Occupational Briefs Semi-Skilled Machine Tool Operator Moravia, New York 35¢

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1.	APPRENTICESHIP STANDARDS	H. A. Spurr 421 Mission Street South Pasadena, California 91030
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MEDICAL TECHNOLOGIST

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2.	AMERICAN MEDICAL TECHNOLOGISTS	American Medical Technologists 710 Higgins Road Park Ridge, Illinois 60068
3.	BE A MEDICAL TECHNOLOGIST	American Society of Medical Technologists Suite 25 Hermann Professional Building Houston, Texas 77025
4.	APPROVED SCHOOLS OF CYTOTECHNOLOGY	Elwood E. Baird, M.D., Chm. Board of Schools of Medical Technology University of Texas Medical Branch Galveston, Texas
5.	CAREER AS A MEDICAL TECHNOLOGIST AND MEDICAL LABORATORY TECHNICIAN	The Institute for Research Chicago, Illinois
6.	CAREERS IN THE MEDICAL LABORATORY	Registry of Medical Technologists Box 2544 Munci, Indiana 47302
7.	EMPLOYMENT OUTLOOK FOR MEDICAL TECHNOLOGISTS	Superintendent of Documents U. S. Government Printing Office Washington, D.C. 20402
8.	FACTS ABOUT MEDICAL TECHNOLOGISTS AND THEIR WORK WITH PATHOLOGISTS	Dallas Johnson, Executive Secretary National Committee for Careers in Medical Technology 1501 New Hampshire Avenue, N.W. Washington, D.C. 20036
9.	FINDING OUT ABOUT MEDICAL ASSISTANTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
0.	FINDING OUT ABOUT MEDICAL RESEARCHERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
11.	FINDING OUT ABOUT MEDICAL TECHNOLOGISTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois

	TITLE	ADDRESS
12.	HORIZONS UNLIMITED	1966 American Medical Association 535 North Dearborn Street Chicago, Illinois 60610
13.	JOBS FOR MEDICAL LABORATORY ASSISTANTS	Superintendent of Documents Washington, D.C. 20402
14.	MEDICAL ASSISTANTS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
15.	MEDICAL-LABORATORY ASSISTANT (CERTIFIED)	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
16.	MEDICAL LABORATORY CAREERS WITH A FUTURE	Medical Technology Muncie, Indiana 47302
17.	MEDICAL TECHNOLOGIST BIOANALYST	Occupational Guide Department of Employment State of California San Francisco Bay Area California
18.	MEDICAL TECHNOLOGIST	Job Information Florida State Employment Service Tallahassee, Florida
19.	MEDICAL TECHNOLOGIST	Occupational Guide Department of Employment State of Idaho P. O. Box 520 Boise, Idaho 83701
20.	MEDICAL TECHNOLOGIST	Kansas State Employment Service 402 East 2nd Wichita, Kansas
21.	MEDICAL TECHNOLOGIST	Occupational Guide State of Missouri Division of Employment Security Missouri
22.	MEDICAL TECHNOLOGIST	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625

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23.	MEDICAL TECHNOLOGIST	The New Mexico State Employment Service New Mexico
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27.	MEDICAL TECHNOLOGISTS	Careers Largo, Florida
28.	MEDICAL TECHNOLOGIST	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
29.	MEDICAL TECHNOLOGISTS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
30.	MEDICAL TECHNOLOGIST	Washington State Occupational Guide Washington
31.	MEDICAL TECHNOLOGIST PATHOLOGIST SEPTEMBER 1963	Registry of Medical Technologists Box 2544 Muncie, Indiana
32.	MEDICAL TECHNOLOGIST PATHOLOGIST JULY 1966	Registry of Medical Technologists Box 2544 Muncie, Indiana
33.	MEDICAL TECHNOLOGIST PATHOLOGIST FEBRUARY 1967	National Committee for Careers in Medical Technology 1501 New Hampshire Avenue, N.W. Washington, D.C. 20036

	TITLE	ADDRESS
34.	MICROBIOLOGIST (BACTERIOLOGIST)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
35.	OCCUPATIONAL GUIDE FOR MEDICAL TECHNOLOGIST	Employment Security Department of South Dakota Sioux Falls, South Dakota
36.	SHOULD YOU BE A MEDICAL TECHNOLOGIST?	Career Information Service New York Life Insurance Company Box 51 Madison Square Station New York, New York 10010
37.	THE PRIDE OFTHE PROFESSION	American Medical Technologists 710 Higgins Road Park Ridge, Illinois
38.	TST FORUM	National Science Teachers Association 1201 Sixteenth Street, N.W. Washington, D.C.
39.	WHAT KIND OF CAREER COULD I HAVE IN A MEDICAL LABORATORY	Medical Technology Muncie, Indiana 47302
40.	WHAT IS A MEDICAL TECHNOLOGIST?	The Upjohn Company Kalamazoo, Michigan

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1.	APPRENTICESHIP STANDARDS FOR MILLWRIGHTS	Educational Department United Brotherhood of Carpenters and Joiners of America 101 Constitution Avenue, N.W. Washington, D.C. 20001
2.	FINDING OUT ABOUT MILLWRIGHTS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
3.	INDUSTRIAL MACHINERY REPAIRMEN	Occupational Outlook Handbook
4.	MILLMAN, WOODWORKING	Kansas State Employment Service 402 E. 2nd Wichita, Kansas
5.	MILLWRIGHT	Occupational Guide State of California Department of Employment San Francisco Bay Area California
6.	MILLWRIGHT (LUMBER AND WOOD PROCESSING INDUSTRY)	Occupational Guide State of California Department of Employment North Coast Counties California
7.	MILLWRIGHT	Careers Largo, Florida
8.	MILLWRIGHT	Chronicle Occupational Briefs Moravia, New York 35¢
9.	MILLWRIGHT (INDUSTRIAL)	Division of Employment Security Bureau of Research and Statistics John Fitch Plaza Trenton, New Jersey 08625
10.	MILLWRIGHTS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
11.	MILLWRIGHTS	Machines and Repairmen Occupational Outlook Handbook
12.	MILLWRIGHT	Michigan Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan

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3.	OFFICE MACHINE SERVICEMAN	Occupational Guide Department of Employment State of Idaho P. O. Box 520 Boise, Idaho 83701
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8.	OFFICE MACHINE SERVICEMEN	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
9.	OFFICE MACHINE SERVICEMEN-REPAIRMEN	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
10.	OFFICE MACHINE SERVICEMAN	Washington State Occupational Guide Washington
11.	TYPEWRITER SERVICEMAN	Florida State Employment Service Job Information Tallahassee, Florida

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	TITLE	ADDRESS
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3.	OPTICIANS	Occupational Briefs Science Research Associates, Inc. 259 East Erie Street Chicago II, Illinois
4.	YOUR CAREER IN OPTICS	Optical Society of America 1155 Sixteenth Street, N.W. Washington, D.C. 20036

PHOTOGRAPHER

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1.	A SURVEY OF COURSES OFFERED IN PHOTOGRAMMETRY	American Society of Photogrammetry 6269 Leesburg Pike Falls Church, Virginia
2.	A SURVEY OF PHOTOGRAPHIC INSTRUCTION	Eastman Kodak Company Sales Service Division Rochester 4, New York
3.	CAREERS IN EQUIPMENT TECHNOLOGY FOR A FAST-GROWING PHOTOGRAPHIC INDUSTRY	State University Agricultural and Technical Institute Farmingdale Long Island, New York
4.	CAREERS IN PHOTOGRAPHY	Public Relations Department Rochester Institute of Technology Rochester, New York 14608
5.	CAREERS IN PHOTOGRAPHY	Universal Photo Books New York 10, New York
6.	COMMERCIAL AND INDUSTRIAL PHOTOGRAPHERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
7.	FINIDING OUT ABOUT PHOTOGRAPHIC EQUIPMENT MANUFACTURING WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
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9.	FINDING OUT ABOUT PORTRAIT PHOTOGRAPHERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
10.	PHOTOGRAPHER	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California
11.	PHOTOGRAPHIC MANUFACTURING WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
12.	PHOTOGRAPHY AS A CAREER	The Institute for Research Chicago, Illinois

	TITLE	ADDRESS
13.	PHOTOGRAPHY AS A CAREER	Professional Photographers of America, Inc. 1090 Executive Way, Oak Leaf Commons Des Plaines, Illinois 60018
14.	PORTRAIT PHOTOGRAPHER	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
15.	PRESS PHOTOGRAPHERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611
16.	WHAT ABOUT A CAREER IN PHOTOGRAMMETRY?	American Society of Photogrammetry 105 N. Virginia Avenue Falls Church, Virginia 22046

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6.	FINDING OUT ABOUT PLASTERERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
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QUALITY CONTROL

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1.	ENGINEERING A CREATIVE PROFESSION	Engineers' Council for Professional Development Inc. 345 East 47th Street New York, New York 10017
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3.	QUALITY CONTROL LABORATORY TECHNICIAN (CHEMICAL MANUFACTURING PLANT)	Occupational Guide Department of Employment State of Idaho P. O. Box 7189 Boise, Idaho 83707
4.	QUALITY CONTROL MANAGER	Occupational Guide State of California Department of Employment San Francisco Bay Area San Jose Metropolitan Area California
5.	STARTING POSITIONS WITH CORNING	Career Development Manager Corning Glass Works Corning, New York

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SHEET METAL WORKER

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2.	APPRENTICESHIP STANDARDS	The Sheet Metal Workers International Association Local Union No. 41 Indianapolis, Indiana
3.	FINDING OUT ABOUT SHEET METAL WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago 11, Illinois
4.	NATIONAL APPRENTICESHIP AND TRAINING STANDARDS FOR THE SHEET METAL INDUSTRY	U. S. Department of Labor Bureau of Apprenticeship and Training Washington, D.C. 20210
5.	PUBLICATIONS	National Warm Air Heating & Air Conditioning Association March 1, 1966
6.	SHEET METAL - A HIGHLY SKILLED BASIC TRADE WITH A FUTURE	Mimeographed Paper
7.	SHEET METAL AND AIR CONDITIONING CONTRACTOR NATIONAL ASSOCIATION, INC.	107 Center Street Elgin, Illinois
8.	SHEET METAL FABRICATING MACHINE OPERATOR	Kansas State Employment Service 402 E. 2nd Wichita, Kansas
9.	SHEET METAL ASSEMBLER (AIRCRAFT MFG.)	Kansas State Employment Service 402 E. 2nd Wichita, Kansas
10.	SHEET METAL TRADES	Florida State Employment Service Tallahassee, Florida
11.	SHEET METAL WORKER SHEET METAL WORKER APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area with Solano County California
12.	SHEET METAL WORKER	Careers Largo, Florida

	TITLE	ADDRESS
13.	SHEET METAL WORKER	Chronicle Occupational Briefs Moravia, New York 35¢
14.	SHEET METAL WORKER	Occupational Guide Employment Security Agency State of Idaho P. O. Box 520 Boise, Idaho
15.	SHEET METAL WORKER	Occupational Guide Research and Statistics Section 10 North Senate Indianapolis, Indiana
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17.	SHEET-METAL WORKER, AIRCRAFT	Occupational Guide State of California Department of Employment Los Angeles-Long Beach California
18.	SHEET METAL WORKER APPRENTICE	Job Guide Department of Labor and Industrial Relations Bureau of Employment Security Honolulu, Hawaii
19.	SHEET-METAL WORKERS	Occupational Outlook Handbook Building Trades
20.	SHEET METAL WORKER	Division of Employment Security Bureau of Research and Statistics 28 West State Street Trenton, New Jersey 08625
21.	SHEET METAL WORKER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
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26.	THE SHEET METAL WORKER	Sheet Metal Workers' International Association 1000 Connecticut Avenue Washington, D.C. 20036

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4.	SHOE REPAIRMAN	Chronicle Occupational Briefs Moravia, New York 35¢
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STONEMASON

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1.	STONEMASON	Careers Largo, Florida
2.	STONEMASON	Chronicle Occupational Briefs

STRUCTURAL STEEL WORKER

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1.	ABC'S OF STEELWATCHING	New State Office Building Harrisburg, Pennsylvania
2.	IRONWORKER, SHOP (IRONWORKER APPRENTICE)	Occupational Guide State of California Department of Employment San Francisco Bay Area California
3.	IRON WORKERS	The Associated General Contractors of America, Inc. 1957 E Street, N.W. Washington 6, D. C.
4.	STEEL WORKER (STRUCTURAL-ORNAMENTAL, ETC.)	Utah Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111
5.	STRUCTURAL AND ORNAMENTAL METAL WORKERS	Job Brief Michigan Employment Security Commission 7310 Woodward Detroit, Michigan 48202
6.	STRUCTURAL IRON AND STEEL WORKERS	Chronicle Occupational Briefs Moravia, New York 35¢
7.	STRUCTURAL, ORNAMENTAL, AND REINFORCING-IRON WORKERS	Careers Largo, Florida
8.	STRUCTURAL-STEEL WORKER STRUCTURAL-STEEL WORKER APPRENTICE	Occupational Guide State of California Department of Employment San Francisco Bay Area California
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10.	STRUCTURAL-STEEL WORKERS	Science Research Associates, Inc. 259 East Erie Street Chicago, Illinois 60611

TILE SETTER

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1.	MARBLE SETTER	Employment Information Series Ohio State Employment Service Ohio
2.	MARBLE SETTERS, TILE SETTERS AND TERRAZZO WORKERS	Careers Largo, Florida
3.	TILE SETTER	Careers Largo, Florida
4.	TILE SETTER	Job Information Florida State Employment Service Tallahassee, Florida
5.	TILE SETTER	Job Guide Department of Employment Security 174 Social Hall Avenue Salt Lake City, Utah 84111

VOCATIONAL
EDUCATION
DEPARTMENT
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PENNSYLVANIA
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UNIVERSITY

Final Report

THE DEVELOPMENT AND EVALUATION OF A PILOT COMPUTER-ASSISTED OCCUPATIONAL GUIDANCE PROGRAM

(Project No. 16033, 17033, 18033)

(Appendix E: Measuring Instruments Developed)

Joseph T. Impellitteri
Principal Investigator

July 31, 1968

VOCATIONAL – INDUSTRIAL EDUCATION **Research Report**

PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION

Bureau of Vocational, Technical
and Continuing Education

007 592

MEMORANDUM

TO: The ERIC Clearinghouse on Vocational and Technical Education
The Ohio State University
980 Kinnear Road
Columbus, Ohio 43212

FROM: (Person) Clarence A. Dittenhafer (Agency) Pa. RCU

(Address) Bureau of Research 214 Executive House Pa. Dept. Of Public Instruction
P. O. Box 911, Harrisburg, Pa. 17126

DATE: November 7, 1968

RE: (Author, Title, Publisher, Date) Impellitteri, Joseph I. The Development and Evaluation of a Pilot Computer - Assisted Occupational Guidance Program, Pennsylvania State University, July 1968

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APPENDIX E

MEASURING INSTRUMENTS DEVELOPED

1. OCCUPATIONAL VALUE INVENTORY
2. OCCUPATIONAL PROJECTIONS INVENTORY
3. REACTION INVENTORY
4. TEST OF SPECIFIC KNOWLEDGE ABOUT OCCUPATIONS

OCCUPATIONAL VALUES INVENTORY

(Revised, 1968)

Joseph T. Impellitteri
Francis J. Paolone

DEPARTMENT OF VOCATIONAL EDUCATION
THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA.

Values Inventory
JTI/FJP

Directions

This is a survey of work values, factors which people might consider important in selecting an occupation. For some people getting satisfaction from their work is important. For others it's the respect that people show for the kind of work that the person is doing. Many people feel that the wages or salary received for work accomplished is the most important factor in selecting an occupation.

On the following pages you will find 35 groups of three phrases, each phrase describing a particular value. In each group you are to decide which of the three values is most important to you at this time and which is least important. You must leave one phrase blank.

In some cases you may feel that all three of the values are important to you. In other cases you may feel that all three values are unimportant. Nevertheless, you must indicate the most and the least important value in each group, and leave one blank.

Below is a sample of a group of three phrases describing three values:

SAMPLE GROUP	MOST IMPORTANT	LEAST IMPORTANT
a. It's the kind of job that offers possibilities for traveling		x
b. there is plenty of variety in this work	x	
c. this career provides opportunities to meet people		

Now that you have examined the three phrases in the sample group you might feel that phrase (b) "there is plenty of variety in this work" is most important to you at this time. Hence, the line opposite that phrase is checked under the column MOST IMPORTANT.

Then the remaining two phrases are compared to decide which is the least important. If phrase (a) "It's the kind of job that has possibilities for travel" is selected then the line opposite that phrase is checked under the column headed LEAST IMPORTANT.

Within every group there should be one phrase marked as most important, one phrase marked as least important, and one phrase not marked at all. In some cases it may be difficult to decide which of the phrases you should check. Make the best decisions you can. Remember, this is not a test--there are no right or wrong answers. Be sure to amrk one phrase as MOST IMPORTANT and one phrase as LEAST IMPORTANT. Do not skip any groups and do not spend a lot of time with any particular group. Put down your first reaction and go on.

TURN THE PAGE AND BEGIN

Answer this question for each and every group.

The kinds of factors which I consider to be most important and least important in choosing a career for myself are:

		MOST IMPORTANT	LEAST IMPORTANT
1.	a. the amount of interest I have in the work.	______	______
	b. the opportunities for advancement.	______	______
	c. the beginning salary offered.	______	______
2.	a. a job doing what I've always wanted to do.	______	______
	b. having the ability to do the work.	______	______
	c. there is a demand for workers in this field.	______	______
3.	a. the pay scale for the job.	______	______
	b. the prestige of the work	______	______
	c. I can fulfill my ambitions in this work.	______	______
4.	a. can go to greater heights in this career.	______	______
	b. being prepared with the right training.	______	______
	c. there is a scarcity of available workers for this job.	______	______
5.	a. it's what I've been shooting for.	______	______
	b. I enjoy doing this kind of work.	______	______
	c. I can become wealthy doing this work.	______	______
6.	a. the status which the job carries with it.	______	______
	b. there is a necessity for workers in this area.	______	______
	c. there are many possibilities for promotions.	______	______

	MOST IMPORTANT	LEAST IMPORTANT
7. a. I am "good at" this kind of work.	______	______
b. I like the financial rewards of the job.	______	______
c. it's what I'd like to do as my life's work.	______	______
8. a. employers desire workers for this career.	______	______
b. I can rise in rank within this field.	______	______
c. there is personal satisfaction for me in doing the work.	______	______
9. a. an opportunity to work in an influential position.	______	______
b. it's my ideal for a job.	______	______
c. my talents lie in this area.	______	______
10. a. the work is stimulating to me.	______	______
b. the wages paid are good.	______	______
c. workers are needed in this field.	______	______
11. a. there are higher positions which can be attained later.	______	______
b. this job commands the respect of others.	______	______
c. I am naturally suited to the work.	______	______
12. a. employers want workers with my kind of training.	______	______
b. "I like the work".	______	______
c. It provides a way of life that is right for me.	______	______

		MOST IMPORTANT	LEAST IMPORTANT
13.	a. the job has steady raises in pay.	______	______
	b. this career offers openings for better jobs in the future.	______	______
	c. people in this career are looked up to.	______	______
14.	a. my capabilities are in this field	______	______
	b. the job fits into my plan of life.	______	______
	c. the work is exciting.	______	______
15.	a. there are opportunities to get ahead in this field.	______	______
	b. there is a short supply of workers for this job.	______	______
	c. I appreciate the monetary benefits from the job.	______	______
16.	a. the reputation which the job has.	______	______
	b. working in a job environment that is attractive.	______	______
	c. I can qualify for the job.	______	______
17.	a. the work would be a challenge to me.	______	______
	b. quick placement on the job.	______	______
	c. good possibility on elevation to the top jobs.	______	______
18.	a. the pay rate for the workers in this field.	______	______
	b. I have the educational preparation for the job.	______	______
	c. the work gives me a feeling of importance.	______	______

			MOST IMPORTANT	LEAST IMPORTANT
19.	a.	I can lose myself in this kind of work	______	______
	b.	it's the job I'm looking forward to.	______	______
	c.	I can reach higher levels in this field.	______	______
20.	a.	there is a deficiency of workers in this career.	______	______
	b.	it's an impressive job.	______	______
	c.	the salary allows me to buy many of the things I've always wanted.	______	______
21.	a.	I have experience with this work.	______	______
	b.	I can progress within the career.	______	______
	c.	the work must be pleasant for me.	______	______
22.	a.	the job is my own choice.	______	______
	b.	there is considerable income I can receive from the job.	______	______
	c.	there is a lack of personnel within this field.	______	______
23.	a.	the job gives me a position of command.		
	b.	I am happy doing this work	______	______
	c.	I can move upward quickly in this job.	______	______
24.	a.	can become financially well-off.	______	______
	b.	workers are wanted for this job.		
	c.	the job is within my reach.	______	______
25.	a.	the job is a personal objective for me.	______	______
	b.	this career can lead to better jobs.	______	______
	c.	people on this job are admired by others.		

			MOST IMPORTANT	LEAST IMPORTANT
26.	a.	I prefer doing this kind of work.	______	______
	b.	I am able to meet the requirements.	______	______
	c.	I can make a good living.	______	______
27.	a.	employers are requesting workers to enter this field.	______	______
	b.	the job gives me control over others.	______	______
	c.	this job gives me a purpose in life.	______	______
28.	a.	there is potential for growth within this career	______	______
	b.	the "size of the paycheck".	______	______
	c.	I have the proper skills for this job.	______	______
29.	a.	this work is personally gratifying.	______	______
	b.	it has been my lifelong intention to get into this field.	______	______
	c.	I want the authority that goes with the job.	______	______
30.	a.	it's an opportunity to use my training and background.	______	______
	b.	I can be sure of a job even in hard times.	______	______
	c.	there is contentment for me in doing this work.	______	______
31.	a.	I can make a lot of money in this career.	______	______
	b.	this job provides opportunities to improve myself.	______	______
	c.	opportunity to help others through this work.	______	______

		MOST IMPORTANT	LEAST IMPORTANT
32.	a. there is esteem associated with the work.	______	______
	b. I have the technical know-how to do the work.	______	______
	c. there is a labor shortage in this field.	______	______
33.	a. the work agrees with me.	______	______
	b. I like the possible earnings from the job.	______	______
	c. it's a position of power and superiority.	______	______
34.	a. I can advance to positions of management in this career.	______	______
	b. this work is what I've planned for.	______	______
	c. I have the potential for doing this work.	______	______
35.	a. the future prospects for this job look good.	______	______
	b. people in this work are held in high regard.	______	______
	c. it's a job that I can give much attention to.	______	______

OCCUPATIONAL PROJECTIONS INVENTORY

COMPUTER

ASSISTED

OCCUPATIONAL

GUIDANCE

DEPARTMENT OF VOCATIONAL EDUCATION
DR. JOSPEH T. IMPELLITTERI
MR. FRANCIS J. PAOLONE

THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA.
1967

DIRECTIONS:

Below you will find a list of occupations. For each of the occupations you should decide what you believe to be the probability of your succeeding (as you consider "success") in that occupation.

Following each of the job titles are the numbers 5 - 4 - 3 - 2 - 1. They designate your estimate of potential success on that job. For example:

5 - means that you think you would almost certainly succeed in that particular line of work.

4 - means that you think you probably would succeed in that particular occupation.

3 - means that you think you probably would not succeed in that particular occupation.

2 - means that you think you would almost certainly not succeed in that particular occupation.

1 - means that you are undecided or unsure of how successful you might be in that particular line of work.

You are to circle the number which is most appropriate to your expectation of success for that particular occupation. Make the best decisions you can. Remember this is not a test -- there are no right or wrong answers. Merely indicate your honest feelings about each occupation. There is no time limit.

TURN THE PAGE AND BEGIN

OCCUPATION	PROBABILITY OF SUCCESS				
	Very Probable	Probable	Not Probable	Very Improbable	Undecided
1. Air conditioning and Refrigeration Mechanic	5	4	3	2	1
2. Appliance Serviceman	5	4	3	2	1
3. Arc Welder	5	4	3	2	1
4. Automobile Mechanic	5	4	3	2	1
5. Autobody Repairman	5	4	3	2	1
6. Automobile Service Station Attendant	5	4	3	2	1
7. Aviation Mechanic	5	4	3	2	1
8. Barber	5	4	3	2	1
9. Bricklayer	5	4	3	2	1
10. Broadcast Station Technician	5	4	3	2	1
11. Cabinet Maker	5	4	3	2	1
12. Carpenter	5	4	3	2	1
13. Chemical Laboratory Technician	5	4	3	2	1
14. Commercial Airplane Pilot	5	4	3	2	1
15. Computer Customer Engineer	5	4	3	2	1
16. Computer Programmer	5	4	3	2	1

	Very Probable	Probable	Not Probable	Very Improbable	Undecided
17. Construction Laborer	5	4	3	2	1
18. Cook - Chef	5	4	3	2	1
19. Diesel Mechanic	5	4	3	2	1
20. Electrician	5	4	3	2	1
21. Electronics Technician	5	4	3	2	1
22. Farmer	5	4	3	2	1
23. Heavy Construction Equipment Operator	5	4	3	2	1
24. IBM Machine Operator	5	4	3	2	1
25. Lineman	5	4	3	2	1
26. Machinist	5	4	3	2	1
27. Mechanical Draftsman	5	4	3	2	1
28. Medical Technologist	5	4	3	2	1
29. Painter - Paperhanger	5	4	3	2	1
30. Plumber	5	4	3	2	1
31. Policeman	5	4	3	2	1
32. Post Office Clerk	5	4	3	2	1
33. Printer	5	4	3	2	1
34. Radio and T. V. Serviceman	5	4	3	2	1

	Very Probable	Probable	Not Probable	Very Improbable	Undecided
35. Roofer	5	4	3	2	1
36. Surveyor	5	4	3	2	1
37. Telephone Installer	5	4	3	2	1
38. Tool Designer	5	4	3	2	1
39. Tool & Die Maker	5	4	3	2	1
40. Truck Driver	5	4	3	2	1

Be sure that you have circled one and only one number next to each of the occupations.

REACTION INVENTORY

COMPUTER

ASSISTED
OCCUPATIONAL

GUIDANCE

Dr. Joseph T. Impellitteri
Mr. Francis J. Paolone

DEPARTMENT OF VOCATIONAL EDUCATION
THE PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY PARK, PA.

1967

Reaction Inventory
JTI/FJP

DIRECTIONS:

There are three parts (I,II,III) to this Reaction Inventory. Answer each of the questions by placing a mark in the blank space next to the phrase which best describes your judgment about the particular item in question. Read carefully so that your true personal opinions will be given. Note those questions which call for written explanations and note also those questions (at the end of Part III) which require more than one answer. There is no time limit, so you may think about each question and then answer it.

PART I - REACTIONS TO EQUIPMENT

1. Was the computer an aid or an obstacle to you in understanding the occupational information presented?

______ Definitely an Aid ______ Definitely an Obstacle
______ Somewhat of an Aid ______ Somewhat of an Obstacle
______ Little Aid ______ Little bit of an Obstacle
______ No Opinion

2. Did you have enough time at the beginning of your work with the computer to learn how to use it?

______ Definitely Yes ______ Definitely No
______ Somehwat Yes ______ Somewhat No
______ Slightly Yes ______ Slightly No
______ No Opinion

3. Do you think that more or less time is needed to learn how to use the computer?

______ Definitely More Time ______ Definitely Less Time
______ Somewhat More Time ______ Somewhat Less Time
______ Little More Time ______ Little Less Time
______ No Opinion

4. Was it easy or hard for you to learn how to use the computer?

______ Definitely Easy ______ Definitely Hard
______ Somewhat Easy ______ Somewhat Hard
______ Little Bit Easy ______ Little Bit Hard
______ No Opinion

5. At the beginning of your work with the computer were you relaxed or tense when working with it?

______ Definitely Relaxed
______ Somewhat Relaxed
______ Slightly Relaxed

______ Definitely Tense
______ Somewhat Tense
______ Slightly Tense

______ No Opinion

6. During your last session with the computer were you relaxed or tense while working with it?

______ Definitely Relaxed
______ Somewhat Relaxed
______ Slightly Relaxed

______ Definitely Tense
______ Somewhat Tense
______ Slightly Tense

______ No Opinion

7. Do you feel that you were kept active enough when working with the computer?

______ Definitely Active
______ Somewhat Active
______ Slightly Active

______ Definitely Passive
______ Somewhat Passive
______ Slightly Passive

______ No Opinion

8. Do you feel that you should have had more control while in the sessions with the computer?

______ Definitely Yes
______ Somewhat Yes
______ Slightly Yes

______ Definitely No
______ Somewhat No
______ Slightly No

______ No Opinion

9. Do you feel that there were limitations in using this computer?

______ Definitely Yes
______ Somewhat Yes
______ Slightly Yes

______ Definitely No
______ Somewhat No
______ Slightly No

______ No Opinion

PLEASE EXPLAIN:

10. Do you think that this type of equipment is valuable or worthless in helping you to understand more about jobs?

______ Definitely Valuable
______ Somewhat Valuable
______ Slightly Valuable

______ Definitely Worthless
______ Somewhat Worthless
______ Slightly Worthless

______ No Opinion

PLEASE EXPLAIN:

11. Do you think that working with the computer was interesting or dull?

_______ Definitely Interesting
_______ Somewhat Interesting
_______ Slightly Interesting
_______ No Opinion
_______ Definitely Dull
_______ Somewhat Dull
_______ Slightly Dull

12. Overall, do you think that working with the computer is a good or bad way to learn about occupations?

_______ Definitely Good
_______ Somewhat Good
_______ Slightly Good
_______ No Opinion
_______ Definitely Bad
_______ Somewhat Bad
_______ Slightly Bad

13. How often did you meet up with machine errors or breakdowns?

______ Very Often
______ Fairly Often
______ No Opinion
______ Seldom
______ Never

14. Which way of presenting information about jobs was most helpful to you?

______ Typeout on Sheets ______ Slides ______ Tape Recording

PLEASE EXPLAIN:

15. Which way of presenting information about jobs was least helpful to you?

______ Typeout on Sheets ______ Slides ______ Tape Recording

PLEASE EXPLAIN:

PART II - REACTIONS TO CONTENT MATERIAL

1. How would you rate the information presented to you in comparison to other kinds of occupational information to which you have been exposed?

_______ Definitely Superior
_______ Somewhat Superior
_______ Slightly Superior
_______ No Opinion
_______ Definitely Inferior
_______ Somewhat Inferior
_______ Slightly Inferior

2. What is your opinion as to the information itself?

______ Definitely Valuable
______ Somewhat Valuable
______ Slightly Valuable
______ Definitely Worthless
______ Somewhat Worthless
______ Slightly Worthless
______ No Opinion

3. What is your opinion as to the information itself?

______ Definitely Interesting
______ Somewhat Interesting
______ Slightly Interesting
______ Definitely Dull
______ Somewhat Dull
______ Slightly Dull
______ No Opinion

4. Was the information easy or difficult to understand?

______ Definitely Easy
______ Somewhat Easy
______ Slightly Easy
______ Definitely Difficult
______ Somewhat Difficult
______ Slightly Difficult
______ No Opinion

5. Do you feel that the information about the occupations was too general or too detailed?

______ Definitely General
______ Somewhat General
______ Slightly General
______ Definitely Detailed
______ Somewhat Detailed
______ Slightly Detailed
______ No Opinion

6. Do you feel that there was enough information about each of the various occupations?

______ Definitely Yes
______ Somewhat Yes
______ Slightly Yes
______ Definitely No
______ Somewhat No
______ Slightly No
______ No Opinion

7. Do you think that there was sufficient variety of information about the various occupations?

______ Definitely Yes
______ Somewhat Yes
______ Slightly Yes
______ Definitely No
______ Somewhat No
______ Slightly No
______ No Opinion

8. Do you feel that this information was and will be of use to you?

______ Definitely Yes
______ Somewhat Yes
______ Slightly Yes
______ Definitely No
______ Somewhat No
______ Slightly No
______ No Opinion

9. Did the computer-based material encourage you to explore occupations on your own?

_____ Definitely Yes
_____ Somewhat Yes
_____ Slightly Yes
_____ No Opinion
_____ Definitely No
_____ Somewhat No
_____ Slightly No

10. Do you think that the occupational information helped you to relate your knowledge about yourself to the characteristics of the various occupations?

_____ Definitely Yes
_____ Somewhat Yes
_____ Slightly Yes
_____ No Opinion
_____ Definitely No
_____ Somewhat No
_____ Slightly No

11. As a result of the occupational information you've received, are you considering more or fewer possible occupational choices than before?

_____ Definitely More
_____ Somewhat More
_____ Slightly More
_____ No Opinion
_____ Definitely Fewer
_____ Somewhat Fewer
_____ Slightly Fewer

12. Which source of information was most helpful?

_____ Typeout on Sheets _____ Slides _____ Tape Recordings

PLEASE EXPLAIN:

13. Which source of information was least helpful?

_____ Typeout on Sheets _____ Slides _____ Tape Recordings

PLEASE EXPLAIN:

14. Compared to other sources of information (i.e., books, lectures, pamphlets, talks, etc.) the attention you were able to give to the computer-based information was:

_____ Definitely More Attention
_____ Somewhat More Attention
_____ Slightly More Attention
_____ About the Same
_____ Definitely Less Attention
_____ Somewhat Less Attention
_____ Slightly Less Attention

PART III - REACTIONS TO PROCEDURES

1. If you had to make a choice, how favorable or unfavorable would you be towards computer-assisted occupational information as compared to other means of getting occupational information.

_____ Definitely More Favorable
_____ Somewhat More Favorable
_____ Slightly More Favorable
_____ No Opinion
_____ Definitely Less Favorable
_____ Somewhat Less Favorable
_____ Slightly Less Favorable

2. How long do you think you could work efficiently with the computer at one sitting?

_____ Less than 1/2 Hour
_____ 1/2 Hour to 1 Hour
_____ 1 to 2 Hours
_____ Over 2 Hours

3. In view of what you have learned in this program, how do you feel about the effort you put into it?

_____ Definitely Satisfied
_____ Somewhat Satisfied
_____ Slightly Satisfied
_____ No Opinion
_____ Definitely Dissatisfied
_____ Somewhat Dissatisfied
_____ Slightly Dissatisfied

4. Did you miss or wish for opportunities for discussion of problems during your sessions with the computer?

_____ Definitely Yes
_____ Somewhat Yes
_____ Slightly Yes
_____ No Opinion
_____ Definitely No
_____ Somewhat No
_____ Slightly No

5. Do you feel that you had adequate time to think about the information as it was presented during your sessions with the computer?

_____ Definitely Adequate
_____ Somewhat Adequate
_____ Slightly Adequate
_____ No Opinion
_____ Definitely Inadequate
_____ Somewhat Inadequate
_____ Slightly Inadequate

6. What is your opinion as to the sequence or order of presentation of information on the various occupations?

_____ Definitely Logical
_____ Somewhat Logical
_____ Slightly Logical
_____ No Opinion
_____ Definitely Haphazard
_____ Somewhat Haphazard
_____ Slightly Haphazard

7. Which part of the total program helped you the most? Rank from 1 - 5.

_____ Outside Readings or Discussions
_____ Slides
_____ Type outs
_____ Tape Recordings
_____ Opportunities for reviews with the counselor

8. Check any of the following phrases which you think apply to the keypunch and typeouts?

- ______ Confusing to Operate
- ______ Too Little Information
- ______ Too Little Time With It
- ______ Too Little Control Over It
- ______ (YOUR OWN COMMENT)
- ______ Easy to Operate
- ______ Too Much Information
- ______ Too Much Time With It
- ______ Not Very Active for Me

9. Check any of the following phrases which you think apply to the tape recordings:

- ______ Confusing to Listen to
- ______ Unpleasant Voices
- ______ Too Short
- ______ Useless Information
- ______ (YOUR OWN COMMENT)
- ______ Good Interviews
- ______ Pleasant
- ______ Too Long
- ______ Helpful Information

10. Check any of the following phrases which you think apply to the slide pictures:

- ______ Unattractive
- ______ Useless
- ______ Too Small
- ______ No Connection with the Job
- ______ (YOUR OWN COMMENT)
- ______ Attractive
- ______ Helpful
- ______ Not Enough Detail
- ______ Appropriate to the Job

11. What aspect of the program was most enjoyable for you?

Answer ____

____

____

12. What aspect of the program was least enjoyable for you?

Answer ____

____

____

13. What part of the program do you think will help you the most in making a future occupational choice?

Answer ____

____

____

14. What part of the program do you think will help you the least in making a future occupational choice?

Answer____

____

____

15. List any comments, suggestions, or recommendations which you might have to improve the usefulness of the computer-assisted occupational information system:

____

____

____

____

____

____

____

GENERAL KNOWLEDGE OF OCCUPATIONS TEST

The purpose of this test is to find out how much junior high school students knowlabout certain jobs. These jobs have been selected because they are relatively common. The questions cover several specific categories such as: description of what is done, what the working conditions are, the kind of training considered to be necessary for good performance, pay, future opportunities, etc. You are to read each question carefully and select your answer by circling the option which you feel best answers or completes the statements. If you have to guess, make the best guess you can. Answer all questions.

Mechanical Draftsman

The duties of mechanical draftsmen include

A. checking dimensions of certain parts in relation to others.
B. making blueprints.
C. transferring sketches into working plans.
D. all of the above.

What level of training is now usually recommended for the mechanical draftsman?

A. high school.
B. 4-year college.
C. 2-year technical school.
D. 5-year cooperative college program.

The draftsman usually works in

A. well lighted and ventilated surroundings.
B. a room by himself.
C. a section of the machine shop.
D. a copy room.

Yearly salaries vary a great deal for mechanical draftsmen, the beginner usually starting at about

A. $3500.
B. $4300.
C. $5000.
D. $5700.

<u>Postal Clerk</u>

The postal clerk is considered to be an employee of

A. the state.
B. the national government.
C. the town where he works.
D. the county.

Training for the position of postal clerk requires

A. a high school diploma.
B. some college training.
C. that the employee has completed his armed service requirement.
D. none of these.

Postal clerks

A. are in constant contact with the public.
B. carry heavy sacks of mail much of the time.
C. spend many hours standing on their feet.
D. work irregular hours.

The employment outlook for postal employes is

A. good.
B. average.
C. fair.
D. poor.

Computer Customer Engineer

One of the major jobs of the computer customer engineer is

A. to design various equipment.
B. to develop computer programs.
C. to install computers and related equipment.
D. to determine the equipment needs of a prospective customer.

Average yearly salaries for computer customer engineers are in the range of

A. $3000-$4500.
B. $4500-$6000.
C. $6000-$7500.
D. $7500-$9000.

Job opportunities for computer customer engineers are

A. excellent.
B. good.
C. fair.
D. poor.

Training for the job of computer customer engineer can be obtained

A. while in high school.
B. through an approved apprenticeship.
C. only through the employee's company.
D. from a two-year technological school or junior college.

Broadcast Technician

A broadcast technician

A. organizes the schedule of program for the station.
B. sells advertising time to business and private customers.
C. sets up and maintains the equipment used to transmit radio waves.
D. determines the kind of equipment needed.

Broadcast technicians are required

A. to have passed the civil service examination.
B. to have completed at least two years of a post high school electronics course.
C. to have a radiotelephone first class operators license.
D. all of the above.

Most of the positions for broadcast technicians

A. are located in metropolitan areas.
B. require at least a two-year college training.
C. are found in average sized towns where duties are more varied.
D. are found in television work.

The demand for broadcast technicians

A. is advancing rapidly.
B. is expected to advance slowly.
C. is relatively stable.
D. probably will decline.

Tool Designer

The tool designer's work includes

A. the use of blueprints.
B. making calculations for dimensions and tolerances.
C. working with machine operators.
D. all of the above.

Tool designer's yearly salaries range from approximately

A. $4000-$8000.
B. $5000-$8000.
C. $6000-$10,000.
D. $8000-and up.

The preferred method of training to become a tool designer is through

A. on-the-job training.
B. a one year technical course.
C. a five year apprenticeship.
D. training in the armed forces.

Tool designers should have a good high school preparation in

A. english and math.
B. math and shop.
C. shop and drafting.
D. drafting and math.

Surveyor

The surveyor's job is to

A. determine the exact location and measurement of points, lines and contours on the earth's surface.
B. determine measurements and develop designs for the construction of buildings, etc.
C. make geological maps of the earth's surface.
D. set up plans for the layout of highways, pipe lines, etc.

Most of the surveyor's time is spent

A. working in close cooperation with builders at the job site.
B. sitting at a desk drawing maps and making reports.
C. at the job site making measurements and calculations.
D. away from home due to the frequency of changes in job locations.

Working as a surveyor, one can expect

A. to work on rotating shifts.
B. to work long hours during the summer.
C. to be layed-off during bad weather.
D. to have a steady work schedule week all year round.

The opportunities for advancement for a surveyor with experience and training

A. is limited.
B. is determined by one's score on a written test.
C. is good because of the different levels of related jobs.
D. is only fair.

Computer Programmer

The job of the computer programmer is

A. to run the computer programs.
B. to set up the computer facilities for new customers.
C. to do the thinking that makes the computer work.
D. to punch data cards.

The computer programmer

A. often has to work overtime in order to meet deadlines.
B. requires a 4-year college degree.
C. frequently must work in tight quarters.
D. can get training in high school technical programs.

The starting salaries for inexperienced computer programmers range from approximately

A. $3000-$3500 per year.
B. $3500-$4000 per year.
C. $4000-$4500 per year.
D. $4500-$5000 per year.

The demand for computer programmers

A. is poor.
B. is fair.
C. is considered to be excellent.
D. is unknown due to the changing nature of the technology.

Printer

Printing is

A. a process for transferring impressions of words and other illustrations onto various materials.
B. a method for making impressions in paper.
C. none of the above.
D. all of the above.

A Journeyman printer is required to have at least a

A. high school diploma.
B. technical school certificate.
C. certificate of apprenticeship.
D. college degree.

Printing is considered to be a

A. white collar occupation even though one is working with machines.
B. physically strenuous job.
C. high stress occupation due to the precision required.
D. rather messy job.

Printing, as a trade, is unique because

A. it is a highly specialized skill requiring specific training.
B. it offers many different specializations.
C. its pay level is well above the average for skilled workers.
D. job opportunities are nearly always available.

Commercial Airplane Pilot

The commercial airplane pilot

A. supervises the loading and unloading of his plane.
B. charts the course of flight before taking off.
C. is in charge of the flight crew, but not the stewardesses.
D. none of the above.

In order to be a commercial pilot

A. a private license with at least 200 hours in the air is required.
B. one must have a license issued by the federal aviation agency.
C. one must be at least 21 years old.
D. some college training must be completed.

A factor to be considered when choosing work as a commercial pilot is

A. that one will have to be away from home and family much of the time.
B. that if one's health were to change, he would have to find another occupation, probably not connected with air traffic.
C. that it is one of the most hazardous occupations one could enter.
D. that there is little opportunity for advancement.

Salaries for commercial pilots vary over a wide range from about

A. $3000-$19,000.
B. $6500-$35,000.
C. $8500-$28,000.
D. $8500-$40,000.

Electronics technician

Electronics technicians

A. install and repair all kinds of equipment such as radios and television.
B. design and build electronic equipment.
C. are generally hired by manufacturers to service equipment sold to customers.
D. maintain and design electronic equipment.

Generally the electronics technician's work is

A. dirty due to the machines and testing involved.
B. considered to be hazardous.
C. done in well-lighted and clean work areas.
D. limited to one special area.

The job opportunities for electronics technicians and the possibilities for advancement are considered to be

A. below average.
B. average.
C. above average.
D. excellent.

In order to be an adequately trained electronics technician, one must have

A. a high school diploma.
B. one to three years of post high school study.
C. on-the-job training.
D. all of the above.

Policeman

The policeman

A. prosecutes law offenders in the courts.
B. is responsible for preventing criminal activities.
C. is an employee of the national government.
D. must always be in uniform to exercise his authority.

The conditions under which the policeman works may be described

A. as semi-military with 24 hour call.
B. extremely hazardous.
C. as highly stressful, due to their close contact with all kinds of people.
D. pleasant.

Opportunity for advancement as a policeman is determined by

A. a promotion list.
B. performance on the job.
C. one's score on a written examination.
D. all of the above.

Which of the requirements listed below are standard across the country for all policemen?

A. all applicants must have completed high school.
B. all applicants must have completed their armed service obligation.
C. all applicants must be 21 years of age.
D. all applicants must take a written knowledge test and pass a rigid physical as set up by the national government.

Medical X-ray Technician

Which of the activities listed below is not a responsibility of the medical X-ray technician?

A. positioning the patient.
B. adjusting the film and operating the control of X-ray equipment.
C. giving the patient a solution to drink which helps make a better picture of internal body parts.
D. maintaining the X-ray equipment and keeping records of all activity.

One of the greater dangers of working as an X-ray technician is

A. due to the considerable amount of lifting involved.
B. that of getting an overdose of radiation.
C. that of contracting the patient's illness.
D. that of being sued by the patient because of an error in amount of radiation.

Training to be a medical X-ray technician can be acquired through

A. special high school programs.
B. technical courses in X-ray technology.
C. training programs by hospitals.
D. all of the above.

Prospective medical X-ray technicians should have a discussion with their doctor if they have a problem with

A. asthma.
B. tuberculosis.
C. anemia.
D. allergies.

Chemical Lab Technician

Which of the items below is not a duty of chemical lab technicians?

A. prepares chemicals and chemical products for consumer use.
B. must be able to solve engineering and scientific problems.
C. prepares formal scientific reports concerning research.
D. works with chemists and engineers in making experiments and analysis.

The general working conditions for chemical lab technicians includes:

A. being in an atmosphere filled with strong chemical odors.
B. the necessity to stand much of the day.
C. a constant danger of injury from the chemicals being handled.
D. none of the above.

The chemical lab technician will probably have a good opportunity to advance depending upon

A. how much experience he has had.
B. whether he has completed his armed service obligation.
C. whether he completed a college degree.
D. whether he scores satisfactorily on a written examination.

Employment opportunities for chemical lab technicians are expected to be

A. excellent.
B. good.
C. fair.
D. poor.

Farmer

An important and necessary job for the farmer in order to keep the modern farm successful is

A. to have irrigation equipment.
B. to keep accurate records of production costs.
C. to diversify by having a variety of crops and animals.
D. to remove fences, etc. and practice contour farming.

The occupation of farming is somewhat unique because the farmer

A. can plan his workday to suit his needs.
B. may have to work in all kinds of weather.
C. has no worry of being layed-off.
D. does not have to pay income taxes.

The best training for being a farmer is

A. to go to college.
B. to work as an apprentice.
C. to have been raised on a farm.
D. to go to a vocational agriculture high school.

Job opportunities in the farming occupation are

A. increasing slowly due to the increase in population and the need for more food.
B. holding their own because farms are frequently family enterprises and are passed on from generation to generation.
C. decreasing because the cost of operation is more.
D. increasing rapidly.

Heavy Construction Equipment Operator

Heavy equipment operators operate equipment used for the general purpose of

A. moving earth.
B. placing structural framing in construction.
C. laying concrete, asphalt, etc.
D. none of the above.

A heavy equipment operator must have completed at least

A. a vocational high school program.
B. an apprenticeship.
C. some college work.
D. none of the above.

Employment opportunities for heavy equipment operators

A. are expected to rise significantly.
B. will tend to remain the same.
C. are expected to decline slowly.
D. will decline sharply.

A heavy equipment operator's pay is determined largely by

A. the method by which he was trained and experience.
B. type and size of machine.
C. the kind of job and its geographical location.
D. B and C.

Bricklayer

The bricklayer must be able to

A. design and make plans for walls and other items constructed of brick.
B. read architectural blueprints in order to determine how to lay out and erect structures.
C. look at a set of plans and decide how much material is needed.
D. understand the characteristics and structural properties of the various kinds of brick.

Applicants for apprenticeship in the bricklaying trade

A. must have a high school diploma.
B. must be between 18 and 24 years of age.
C. must pass a physical exam.
D. must join the bricklayers union.

Bricklayers earn approximately ___________ per hour.

A. $2.00-$3.25
B. $2.25-$6.00
C. $2.50-$4.00
D. $3.25-$5.00

Which of the following effects is most important to a bricklayers yearly income?

A. there usually are seasonal layoffs.
B. he must depend on having a good deal of overtime work.
C. he may often have to stop due to construction delays.
D. he must usually travel a good distance in order to find work.

Roofer

One of the jobs of roofers is

A. the laying of sheeting in preparation for the roof.
B. the waterproofing of walls.
C. the installation of moisture barriers in buildings using electric heat.
D. the installation of skylights.

The apprenticeship period for roofer is

A. one year.
B. two years.
C. three years.
D. four years.

An important factor to be considered by prospective roofers is

A. physical strength.
B. the ability to climb and stand for long periods.
C. the fear of high places.
D. all of the above.

The average hourly wage for roofers is about

A. $3.60.
B. $4.20.
C. $4.85.
D. $5.15.

IBM Machine Operator

The IBM machine operator operates

A. electric typewriters and desk calculators.
B. key punch and card reader machines.
C. computers.
D. duplicators and transfer equipment.

The most common method of training for IBM machine operators is

A. to complete a high school technical course.
B. a two year apprenticeship program.
C. on-the-job training by their employer.
D. the completion of a two year associate degree or junior college course.

IBM machine operators can expect their work

A. to change almost daily.
B. to become routine.
C. to require a good deal of travel.
D. to require much overtime.

Working conditions as an IBM machine operator includes

A. well-lighted air-conditioned offices.
B. working under pressure in order to meet deadlines and due-dates.
C. both of the above.
D. neither of the above.

Aviation Mechanic

Which of the following is a responsibility of aviation mechanics?

A. making emergency repairs,
B. troubleshooting and testing of faulty parts
C. routine overhauls of airplane engines
D. all of the above

Certification to work as an aviation mechanic comes through

A. completion of an airlines apprenticeship program.
B. graduation from an approved FAA Mechanic's school.
C. completion of a two-year airplane mechanics program at a college or university.
D. none of the above

A physical requirement for aviation mechanics is that they cannot

A. wear glasses.
B. have a hearing impairment.
C. be color blind.
D. have high blood pressure.

The opportunity for future employment as an aviation mechanic is considered to be

A. excellent.
B. good.
C. fair.
D. poor.

Telephone Installer

Which one of the following is not a duty of telephone installers?

A. the setting up of equipment for switch boards.
B. the location and repair of breaks in telephone lines.
C. the installation of telephones in customers' homes.
D. the location and repair of telephones in use.

The training of a telephone installer

A. is a continuous process throughout his career.
B. is done on the job.
C. requires related vocational training in high school.
D. is largely done in the armed services.

The telephone installer

A. must provide his own hand tools.
B. always works with a partner.
C. must pass a rigid physical exam.
D. very seldom has to climb poles.

The number of new job openings for telephone installers is limited because

A. nearly everybody has a telephone already.
B. telephone service has been extended nationally.
C. modern equipment requires less maintenance.
D. there is little employee turnover.

Cabinetmaker

A cabinetmaker is one who

A. specializes in the construction of cabinets.
B. repairs and refinishes furniture.
C. builds staircases, furniture and cabinets.
D. does the finish woodworking in home construction.

Hourly wages for qualified cabinetmakers range from about

A. $2.00-$5.50.
B. $2.50-$4.20.
C. $3.00-$5.50.
D. $3.00-$6.20

A common form of advancement for cabinetmakers is to

A. become foreman.
B. become shop superintendent.
C. go into business for themselves.
D. become a home contractor.

An important factor for the cabinetmaker is

A. that there is little demand for his services.
B. that he must keep up with the use of new materials in construction.
C. that his work will be seasonal.
D. all of the above.

Air Conditioning and Refrigeration Mechanic

Indicate which of the following is not a job of the refrigeration mechanic.

A. assemblying large units for commercial and industrial use.
B. installing all types of air conditioning and refrigeration units.
C. servicing units for customers.
D. repairing units either at the place of business or home.

The approximate hourly wage range for aid conditioning and refrigeration mechanics is

A. \$2.00-\$3.50.
B. \$2.50-\$4.00.
C. \$3.00-\$4.75.
D. \$3.50-\$5.50.

The overtime work which air conditioning and refrigeration mechanics usually do is a result of

A. rush jobs to meet contract deadlines.
B. emergency repair work.
C. making the best use of good weather and working conditions.
D. the amount of work available at certain times in the year.

Employment opportunities for air conditioning and refrigeration mechanics are

A. excellent.
B. good.
C. average.
D. fair.

Auto Body Repairman

Most auto body repairmen learn their trade through

A. armed service training.
B. an approved apprenticeship.
C. high school vocational training.
D. on the job training.

The employment outlook for auto body repairmen is

A. excellent.
B. good.
C. fair.
D. poor.

Hourly wages for auto body repairmen range from

A. $1.50-$3.50.
B. $2.00-$5.00.
C. $4.00-$5.00.
D. $3.00-$5.75.

Auto body repair work generally

A. is hazardous.
B. is very routine.
C. allows a good opportunity for advancement.
D. is considered strenuous and dirty.

Tool and Die Maker

Tool and die makers specialize in

A. designing and making tools for special purposes.
B. making metal devices to hold various materials while they are being shaped by machines.
C. the development and construction of new tools to be produced for consumer use.
D. custom-making the jigs and fixtures needed for specialized construction work.

The qualified tool and die maker must

A. have completed an approved apprenticeship of five years.
B. be able to make engineering calculations.
C. be certified by his professional union.
D. be skilled in the operation of all types of machine tools.

Tool and die makers may advance to higher level positions by

A. becoming tool designers.
B. setting up their own shops.
C. becoming foremen.
D. all of the above.

Employment opportunities for tool and die makers is

A. excellent.
B. good.
C. expected to stay the same.
D. fair.

Automobile Mechanic

One of the regular duties of the auto mechanic is

A. to explain mechanical difficulties to customers.
B. to clean cars and prepare them for sale.
C. to remove dents and install broken glass when necessary.
D. to appraise cars which are being taken as trade-ins.

Adequate training to become an auto mechanic can be obtained through

A. high school vocational courses.
B. the United States Employment Service.
C. the Armed Forces.
D. all of the above.

Which of the following is not typical of working conditions for automobile mechanics?

A. well lighted and ventilated shops.
B. dirty and greasy car engines and tools.
C. outdoor work.
D. uncrowded work areas.

Auto mechanics generally earn about ________ per hour on the average.

A. $2.50
B. $3.00
C. $3.50
D. $4.00

Diesel Mechanics

Diesel engines are used primarily in heavy-duty motor vehicles and ____________________.

A. railway locomotives.
B. ships.
C. stationary power plants.
D. automobiles.

Diesel mechanics

A. are required to have a high school diploma.
B. are required to have their own tools.
C. generally work in shops which are noisy, poorly ventilated, and poorly lighted.
D. must complete a two-four year apprenticeship depending on background.

Which of the following is not common to the working conditions of diesel mechanics?

A. outdoor work at night at construction sites.
B. consistently working on greasy equipment.
C. a regular work week of 40 hours.
D. a need to move from job to job in order to be where the work is.

Job opportunities for diesel mechanics are expected to ____________ in the next ten years.

A. expand rapidly.
B. increase moderately.
C. remain the same.
D. decrease slowly.

Painter and Paperhanger

The duties of a painter and paperhanger do not normally include

A. the application of sizing.
B. estimating the amount and kinds of materials needed.
C. steaming off old paper.
D. the purchase of the materials to be used.

Typical working conditions for paint and paperhangers include

A. working only in good weather.
B. being under pressure to get the job done by a deadline.
C. the presence of dust and fumes.
D. none of the above.

A paint and paperhanger who is a union member can expect to earn an hourly wage of

A. $3.56.
B. $3.92.
C. $4.11.
D. $4.63.

Job opportunities for paint and paperhangers might be expected to

A. increase greatly.
B. rise slowly.
C. decrease considerably.
D. decrease slightly.

Cook-Chef

In preparing meals a cook-chef is responsible for

A. the entire meal.
B. side dishes and main course only.
C. the main course only.
D. the main course and dessert.

The most common difference between first class chefs as found in large hotels and those in small restaurants is primarily

A. the amount of formal training.
B. geographic locality.
C. union affiliation.
D. age.

The majority of openings for cooks and chefs are with

A. large restaurants and hotels in cities.
B. private clubs and chain restaurants.
C. hospitals, factories, and schools.
D. medium and low-price restaurants.

A skilled chef in a large hotel of in a similar situation may earn as much as

A. $8,000 per year.
B. $10,000 per year.
C. $12,000 per year.
D. $14,000 per year.

Plumber

The plumber installs and repairs pipes and fixtures which carry

A. liquids.
B. gasses.
C. both A and B.
D. neither of the above.

In order to become a journeyman plumber one usually must

A. complete a formal apprenticeship program.
B. pass a competency test.
C. have a high school diploma.
D. be licensed by the government.

The plumber's work is usually done

A. inside.
B. outside.
C. at construction sites.
D. all of the above.

The demand for plumbers is expected to remain fairly high because

A. of the large turnover in this occupation.
B. plumbers have a short work life.
C. it is one of the few construction trades offering year round employment.
D. of the general increase in construction.

Truck Driver

Long distance or interstate truck drivers may be required to have

A. a chauffeur's license.
B. experience as a local light truck driver.
C. passed a company or state examination.
D. all of the above.

All interstate truck drivers

A. must be 21 years of age.
B. must pass a state determined physical examination.
C. know by heart the interstate commerce commission rules.
D. none of the above.

Which of the following is not a duty common to all truck drivers?

A. loading and unloading his truck.
B. making day and night deliveries.
C. selecting the route to be driven.
D. driving in all kinds of weather.

Advancement for truck drivers may come by

A. becoming a dispatcher.
B. starting their own business.
C. none of the above.
D. all of the above.

Automobile Service Station Attendant

The duties of the automobile service station attendants generally include

A. taking out small dents and making other body repairs.
B. doing major engine tune-ups.
C. washing, greasing, and installing accessories for cars.
D. selling used cars.

Training for service station attendants is usually obtained by

A. attending vocational high school programs.
B. completing training programs set up by the oil companies.
C. on the job work.
D. completing a post high school technical school program.

The conditions in which the service station attendant works include

A. Being on 24 hour call.
B. working outdoors in all kinds of weather.
C. working in close association with a crew.
D. not being able to set regular hours.

The approximate average hourly wage rate ranges from

A. $.85-$1.75.
B. $1.10-$2.00.
C. $1.25-$2.00.
D. $1.40-$2.50.

Radio and Television Serviceman

The primary means of advancement for radio and television servicemen who stay in the trade is

A. to become a crew foreman.
B. to open one's own business.
C. to become a salesman.
D. to obtain a job with a large company.

The number of jobs available for radio and television servicemen is expected to

A. grow rapidly.
B. have moderate but steady growth.
C. remain near its present level.
D. decrease gradually over time.

The radio and television serviceman

A. sets up and maintains the equipment used to transmit radio waves.
B. are generally hired by radio and television manufacturers to service any of their equipment sold to customers.
C. works only with radio and television equipment.
D. installs, adjust and repairs home electronic equipment.

Common training requirements for radio and television repairmen are

A. high school diploma and a two year technical course.
B. high school diploma and college.
C. high school diploma.
D. not specified.

Appliance Serviceman

Appliance servicemen service many kinds of home appliances including

A. air conditioners and furnaces.
B. radio and television sets.
C. toasters and washers.
D. all of the above.

Training for appliance servicemen is usually obtained through

A. an informal on-the-job training program.
B. a vocational high school program.
C. a post high school two year technical course.
D. a three year apprenticeship.

The appliance serviceman usually works

A. outdoors.
B. at his employer's shop.
C. in his home.
D. in the customer's home.

Wages for experienced appliance servicemen range from

A. \$1.25-\$2.50 per hour.
B. \$1.50-\$3.15 per hour.
C. \$1.75-\$3.65 per hour.
D. \$2.00-\$3.90 per hour.

The future employment outlook for appliance servicemen appears to be

A. excellent.
B. good.
C. fair.
D. poor.

Electrician

Many states require electricians

A. to have completed a formal two-year technical program.
B. to pass a written examination on building codes.
C. to have a health certificate.
D. to be 21 years of age.

The job of an electrician is generally considered to be

A. an inside job.
B. an outside job.
C. seasonal.
D. one that requires much physical stamina.

The approximate per hour wage range for electricians is

A. \$1.50-\$3.50.
B. \$2.00-\$4.00.
C. \$2.50-\$4.50.
D. \$3.00-\$5.00.

The number of job openings for electricians is expected to increase due to

A. the greater availability of electricity through atomic power plants.
B. the general increase in all kinds of construction.
C. both of the above.
D. neither of the above.

Machinist

The machinist, like the tool and die maker, needs to

A. know how to make engineering computations.
B. be able to make complete engineering drawings.
C. know how to operate many machine tools skillfully.
D. be able to determine what kind of metal will best suit a job's requirements.

The recommended method of obtaining training as an all around machinist is

A. to complete college work.
B. to serve a four year apprenticeship.
C. to work as a machinist's helper.
D. to take machine shop work in high school.

Working as a machinist

A. generally is very strenuous.
B. requires standing most of the day.
C. is fairly hazardous.
D. will require much overtime work during the winter and spring months.

The employment outlook for machinists is

A. excellent.
B. good.
C. fair.
D. poor.

Carpenter

The carpenter is a construction worker who works almost completely with

A. wood and wood products.
B. sheet metal, spouting, etc.
C. concrete, plastic, tiling.
D. wall covering.

The length of a regular carpenter's apprenticeship is

A. 5 years.
B. 4 years.
C. 3 years.
D. 2 years.

A carpenter's work

A. is considered to be very hazardous.
B. requires much physical strength.
C. is generally considered to be an indoor job.
D. is active and strenuous.

Employment for carpenters is expected to

A. decline rapidly.
B. increase a good deal and steadily.
C. increase slowly.
D. stay about where it is and perhaps decline somewhat.

Barber

Which of the following is not a duty of the barber?

A. giving shaves.
B. champooing hair.
C. giving facial massages.
D. manicuring nails.

In most states barbers are required

A. to be certified or licensed.
B. to meet certain health requirements.
C. to complete eight years of school.
D. all of the above.

Training to become a barber may include

A. high school vocational training.
B. completion of an apprenticeship.
C. graduation from a barber's school.
D. all of the above.

Advancement for a barber usually comes in the form of

A. starting one's own business.
B. enlarging his clientele.
C. teaching in a barber's school.
D. all of the above.

Construction Laborer

The basic job of the construction laborer is to

A. set up scaffolding for carpenters.
B. carry up the materials for roofers.
C. dig ditches for draining lines and grade lawns, etc.
D. do whatever jobs are necessary to assist the various craftsmen on the job.

All of the training for construction laborers

A. can be obtained in high school.
B. is received on the job.
C. is obtained through formal apprenticeships.
D. none of the above.

If one plans to remain as a laborer in construction work the chances for advancement are

A. good.
B. fair.
C. average.
D. almost none.

Job opportunities for construction laborers on a year around basis are

A. excellent.
B. good.
C. fair.
D. poor.

Lineman and Cable Splicer

The lineman and cable splicer

A. services telephones installed in customer's home.
B. sets up switchboards and central exchange.
C. constructs power transmission lines both above ground and in tunnels.
D. specializes in the location and repairing of power line breaks.

The usual method of training for linemen and cable splicers is

A. vocational training in high school.
B. on the job training by the employer.
C. the U. S. employment service or armed forces.
D. a two-year technical school or associate college degree program.

All applicants are required

A. to pass a knowledge and skill examination.
B. to be licensed.
C. to pass a physical examination.
D. to be 21 years of age.

Which of the following is common for the lineman and cable splicer?

A. working in extremem weather conditions.
B. doing most of the work indoors.
C. having work limited by the weather.
D. all of the above.

Arc Welder

Arc welding is a means to join metals by

A. heat and extreme pressure.
B. heat and rivets.
C. heat and adding a filler metal different from that being joined.
D. melting and adding metal like that being joined.

The arc welder usually gets his training

A. in high school vocational courses.
B. on the job from his employer.
C. through formal apprenticeships.
D. by going to a welder's school.

One thing arc welders can expect to do is

A. crawl through tight spaces underground.
B. carry much of their equipment with them to where they are working.
C. work in high places above ground.
D. have work only on a seasonal basis.

The employment outlook for arc welders appears to be

A. excellent.
B. good.
C. fair.
D. poor.

VOCATIONAL
EDUCATION
DEPARTMENT
OF THE
PENNSYLVANIA
STATE
UNIVERSITY

Final Report

THE DEVELOPMENT AND EVALUATION OF A PILOT COMPUTER-ASSISTED OCCUPATIONAL GUIDANCE PROGRAM

(Project No. 16033, 17033, 18033)

(Appendix D: Dissemination Materials)

Joseph T. Impellitteri
Principal Investigator

July 31, 1968

VOCATIONAL - INDUSTRIAL EDUCATION **Research Report**

PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION

Bureau of Vocational, Technical
and Continuing Education

ED 027 441

MEMORANDUM

TO: The ERIC Clearinghouse on Vocational and Technical Education
The Ohio State University
980 Kinnear Road
Columbus, Ohio 43212

FROM: (Person) Clarence A. Dittenhafer (Agency) Pa. RCU

(Address) Bureau of Research 214 Executive House Pa. Dept. Of Public Instruction
P. O. Box 911, Harrisburg, Pa. 17126

DATE: November 7, 1968

RE: (Author, Title, Publisher, Date) Impellitteri, Joseph I. The Development and Evaluation of a Pilot Computer - Assisted Occupational Guidance Program, Pennsylvania State University, July 1968

Supplementary Information on Instructional Material

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APPENDIX D: DISSEMINATION MATERIALS

1. Published references not included herein:

   a. Impellitteri, J. T. "A Computerized Occupational Information System." Vocational Guidance Quarterly. 15: 262-264 (June, 1967).

   b. Impellitteri, J. T. "The Potential of Computer-Assisted Occupational Guidance." School Shop. (April, 1968)

   c. Impellitteri, J. T. and Kapes, J. T. "Some Evidence in Using the GATB with Vocational or Technical Bound Ninth Grade Boys. Vocational Guidance Quarterly. (To be published Spring, 1969.)

   d. Impellitteri, J. T. "Computer-Assisted Career Exploration System: Past, Present and Future." Bus. Educ. Quarterly. (To be published in the Fall issue, 1968).

2. Unpublished materials included herein:

   a. Impellitteri, J. T. "Future Experimentation with Computer-Assisted Occupational Guidance at Penn State." Presented at the April, 1968 meeting of APGA, Detroit, Michigan.

   b. Kostenbauder, S. I. "Development of Computer-Assisted Occuaptional Guidance." Presented at the April, 1968 meeting of APGA, Detroit, Michigan.

   c. Hodes, L. N., and Paolone, F. J. "Some Findings from the Field Experiment with the Computer-Based Occupational Information System." Presented at the April, 1968 meeting of APGA, Detroit, Michigan.

   d. Kapes, J. T. "The Validity of the GATB for Predicting Shop Achievement in Secondary Level Vocational-Technical Education." (March, 1968.) A Master's Paper in Counselor Education at P.S.U.

   e. Impellitteri, J. T. "Implementation Problems: Counselor Acceptance of Systems." Presented at the Fourth Symposium of Systems Under Development in Vocational Guidance, Palo Alto, California, March 9, 1968.

f. Impellitteri, J. T. "Experimentation with Computer-Assisted Occupational Guidance." A paper prepared as a dissemination report of progress. January, 1968.

g. Impellitteri, J. T. "The Computer as an Aid to Instruction and Guidance in the School" Presented at the 1967 Regional Seminar and Research Conference in Agricultural Education, Ithaca, New York. November 9, 1967.

h. Kostenbauder, S. I. "A Description of a Program for Computer-Assisted Occupational Guidance at Penn State." Presented at a conference for guidance counselors (Wilkes College, Wilkes-Barre, Pennsylvania). October 28, 1967.

i. Impellitteri, J. T. "Current Guidance Applications of Computers." Presented at a Media Conference at the Center for Vocational Education, The Ohio State University. August 8, 1967.

k. Paolone, Francis J. "Introduction to COG." An explanation of student orientation to the system. September, 1967.

l. Impellitteri, J. T. "Computer-Assisted Occupational Guidance." Presented at the April, 1966 meeting of APGA, Washington, D. C.

Future Experimentation with Computer-Assisted Occupational Guidance at Penn State

A Paper Prepared for the Annual Meeting
of the
American Personnel and Guidance Association

April 7-11, 1968

Detroit, Michigan

Joseph T. Impellitteri
Department of Vocational Education
The Pennsylvania State University

The research and development program my colleagues at Penn State have been discussing with you during the previous 40 minutes was designed a little more than three years ago. I submitted the proposal for the funding of the project to the Pennsylvania Department of Public Instruction in the latter part of March, 1965. It was approved for funding in September, 1965 and we became actively involved in our initial effort in January, 1966. The funding commitment was extended to June 30, 1968 for the purpose of our developing and evaluating a prototype computerized occupational information system.

We thus committed ourselves within this period of two and one-half years to developing an easily up-dated, individualized occupational information retrieval system, focusing on occupations which typically require less than a college degree for entry and which was useable for occupational exploration by ninth grade boys who have indicated they were non-college bound. The project was problem-oriented (i.e. it was directed toward providing ninth grade students with information about occupations for which training was available as a curriculum option in tenth, eleventh and twelfth grades--thus, directed toward wise curriculum choice). The system we have developed is conceived to be a means of stimulating ninth grade boys to further exploration of opportunities in the world of work. It was not designed to be, nor can it be used as a self-sufficient device.

Even with the additional elements of feedback previously described (the discrepancy statements and the listing of occupations based on a student's aptitude-preference profile) the information retrieval system

we have developed is really nothing more than a tool of the guidance counselor. Taken outside of the planned sequence of guidance activities, used prior to a counselor's judging the readiness of the student to participate, lacking in the appropriate follow-up activities--any or all of these occurrences would tend to offset any value to the student of the interactive experience.

It is this particular feature of our system that unfortunately provides the weakest link--it takes a going guidance program to make the system effective. Thus, in terms of evaluation, if we were to try out the system in a school district where $50 worth of quality guidance services were allocated per student per year I'm sure we'd come out golden. If we tried it out, however, in a district where $.50 worth of quality guidance services were available we certainly would obtain a different evaluation reading. In the extreme case, then, a nickel's worth of guidance returns about a nickel's worth of value whether or not you stick a computer into the program.

Any evaluative data we may, in fact, uncover prior to the conclusion of our project will, in fact, have limited generalizability because of the hand-picked nature of our field trials. The high quality of the ongoing guidance program in the Altoona, Pennsylvania School District is unfortunately not typical. The degree of co-operation extended to us by all of the Altoona staff involved in both our spring, 1967 trial and our fall-winter trial of 1968 resulted in a smooth operation throughout. The fact that the youngsters involved in the field trials perceived their experience as part of the school offering and not as a "Penn State experiment" was indicative of the close cooperation we enjoyed.

Such, then, is the status of our project to-date. More than 27 months of effort on the project has been expended. During that period many other projects have been initiated and are being conducted across the country in the area of computer-assisted occupational guidance. The admirable effort of the Tiedeman group at Harvard (Information System for Vocational Decisions), the developments of the Minor-Super-Myers group at IBM-Columbia Teachers College, John Loughary's work at Oregon, the continuing experimentation by Cogswell and Estavan at Systems Development Corporation, as well as three local school district projects being conducted in Palo Alto, California, Rochester, New York and Villa Park, Illinois among many others give one a glimpse of the extent of interest there is in this area. Many of these projects, in fact, either have, or are being reported on at this conference in other sessions.

It is not my intent to present to you even brief descriptions of these projects. I do believe, however, that certain differences in the approach which is generally used in most of the projects mentioned and the approach we have used is important to bring out. The distinguishing element is in our essentially heuristic approach. That is, we have in presenting certain pieces of information in a predetermined sequence sought to stimulate students to form their own concepts about various aspects of the world of work. The approach used in these other efforts I have listed is generally to structure the computer interactive experiences in accordance with accepted framework.

An example demonstrating the difference in approaches would probably be useful at this time for the sake of clarity. Let us say

that we are interested in a student's being able to approximately evaluate his learning ability with respect to the future. Our approach is to allow students to select at will specific occupations which he might be tentatively interested in entering. Our rationale is that if an occupational selection of the student's is inconsistent with his ability to learn (as measured by X test) then we bring the discrepancy to his attention. We assume that in this process youngsters will discover the level of their ability to learn. The contrasting approach as exemplified in the other projects mentioned go through the process (divorced from the tentative occupational choice stage) of forcing a student to rate himself in relation to his peers with respect to learning ability. Information is then fed back to him regarding the accuracy of his self-rating.

What do we see as the relative advantage in using our heuristic approach? Why have we chosen to use it? The primary reason for our use of this approach is that it starts a youngster at a point where he is able to attach some concrete notions to some rather abstract concepts. Youngsters have some information gained through their limited experience of who the policeman, the carpenter or the teachers is and what he does. It would appear that these rather concrete bits of information regardless of the degree of their accuracy would provide a sounder basis upon which to build upon.

From the data collected in the spring, 1967 field trial and the tentative results of our current field trial I have begun to question the soundness of our approach. As reported earlier, it appears that our stimulus is not adequately stimulating. These youngsters simply do not seem to have been able to build their own

comfortable frameworks working with our extremely loosely structured approach.

Based upon this data to a large extent, and influenced to a degree by the arguments of persons working with the contrasting approach, I see us revising our system for future use with ninth graders. The system will retain its heuristic framework but not to the degree to which it is now organized.

The current system will be tried out with eleventh and twelfth grade boys and girls including approximately 200 occupations. The function of the computer will be purely information retrieval, transmission and feedback. The aptitude-preference profile will probably be retained as a means of broadening a student's knowledge of available occupational opportunities.

The system revisions we are planning to undertake will, I believe, result in a more effective system design for use with ninth graders. The changes to be made are listed below.

1. Hardware - the terminal equipment we will be using in the future is the IBM 1500 configuration, including a cathode ray tube display with light pen capability and an image projector. Temporarily we will have no audio capability. Utilizing this terminal equipment the computer language we must adapt is IBM's Coursewriter II which will allow us a great deal more flexibility in programming.
2. We are allowing for a great deal more active participation in the exchange on the part of the student. The passive, information receiving role of the student in the current design is not conducive to him maintaining a high level of attention.

3. The capabilities provided by our using the Coursewriter II language will allow us to periodically summarize for the student consistencies or inconsistencies in his choice pattern, and require him to respond to the accuracy of the summaries. The understanding of self resulting from such a strategy should certainly be enhanced.
4. The occupational description to be included in the system will represent a much wider range of occupations (at least four occupations within each of Roe's 48 cells). The list of occupations included in the current system presuppose that ninth grade youngsters need only explore those occupations that fall within the narrow range of his current interests and capabilities.

The example of a typical interchange listed below will hopefully reveal how we plan to implement some of these changes in our program.

AN EXAMPLE OF AN INTERCHANGE

Computer: Select an occupation from the list of occupations which you would like to be described to you.

Student: Types out number of selection.

Computer: Your first selection is that of lawyer. How much education beyond high school do you estimate a lawyer needs in order to practice? (Alternatives listed.)

Student: Types out letter corresponding to what he believes as the correct alternative.

Computer: Right! The lawyer must not only graduate from a college but also successfully complete three years of law school. Now, what do you know about the kind of work a lawyer would do? Would you estimate he spends most of his time, etc., etc.?

(The exchange continues through a number of essential features of the occupation of lawyer. If the student's estimate is correct he receives the kind of feedback exemplified above. If his estimate is incorrect he will be told that he is wrong and why. At the conclusion of the series of exchanges the program continues.)

Computer: (If student got at least one wrong answer): Since you have at this point learned more about the work of the lawyer are you still interested in this occupation as a tentative possibility for you?

Student:	Yes	or	No
	c: Fine! Is there anything about the work of the lawyer that is not satisfactory to you?		c: Why not?
	s: Yes or No		s: Responds in accordance with a list of reasons given him.

(Student is asked to select two other occupations from the list and the same process as above is repeated. The summary phase then begins when the common characteristics of the three selected occupations are identified by the computer.)

Computer: (On the basis of common level): You have selected three occupations all of which involve a great deal of responsibility and require a great deal of education. Do you think you have the ability to do school work which will enable you to graduate from college or beyond?

Student: Yes.

Computer: You're right. The information in your record indicates that you do have the ability to succeed in higher education, but your grades demonstrate that you're not using your ability. - etc., etc.

(Various other aspects having to do with a student's estimate of his interests, aptitude and achievement are explored in this manner. At the point when the crucial variables have been explored the interaction moves to the broadening of a student's range of occupational possibilities.)

One final comment at this point. With the increased number of computer-assisted guidance projects currently underway the reaction from the general counselor population seems to be one of reluctant optimism. I'm not one of the most perceptive guys around, but I do think I detect a note of tentative approval from most counselor groups. Their general attitude is one of, "Show me more."

I think this is quite revealing. It indicates to me that counselors in general are cautious enough not to wildly approve any new scheme to be developed. Yet, they neither are overly cautious in rejecting the idea that a computer can assist them in performing their job before they hear more. This most promising reaction demonstrates a level of sophistication among our counselors which forecasts a bright future for guidance in our schools.

A Paper Prepared for the Annual Meeting
of the
American Personnel and Guidance Association

April 7-11, 1968
Detroit, Michigan

Scott Kostenbauder
Department of Vocational Education
The Pennsylvania State University

I'd like to start off by telling you a little story. I can not say that this story will be of the traditional toastmasters comical type, but it's informative. I'm going to assume many of you did not attend the APGA convention at Dallas last year or did not see the Penn State booth in the Dallas auditorium. Those of you here who visited us at the Dallas auditorium, particularly early in the week may recall we had some equipment problems. We were there but the equipment wasn't. At least not on Friday, Saturday, or Sunday. A few hurried phone calls told us that there wasn't any on the way because of a communication problem. By Sunday, and quite a few more phone calls later, a decision was made to remove a terminal from the Computer-Assisted Instruction Laboratory at Penn State, load it on the University's Aero Commander and fly it to Texas. I would like to point out that the terminal had to be partially disassembled and shoehorned into the plane on its side. Around midnight Sunday, the plane landed at Love field in a downpour--one of those cat and dog rains. I don't have to tell you that water and electronic equipment are not compatible. In addition to that little law of the physical world, the terminal was dropped when lifted out of the plane and the cabinet broke open exposing the electronic "innards". Meanwhile, at the Dallas auditorium, the night security guard had some company: the IBM Customer Engineer waiting to install the machine, Dr. Impellitteri and myself. At two a.m. a truck backed up to the auditorium door. We brought the terminal equipment inside, in pieces, and began. When the auditorium opened Monday a few of you found us sitting on the floor surrounded by test instruments and tools and looking pretty tired. A little past ten Monday morning we got on-line from Penn State with a terminal as dry

as the TLC of the IBM people could make it. Considering all of the incidents, we had excellent reliability from this equipment. Down twice all week, once because of a bad transistor and once due to the phone connection. We were connected by voice-grade telephone lines to the IBM 1410 computer at Penn State.

I mentioned some numbers and devices so I'll continue with an overview of what is necessary for an operating system. These are:

1. A suitable computer with data transmission attachements.
2. A voice-grade telephone line, a Data phone attachment, and a terminal for each student station.
3. An executive or dean program that administers the operation of other programs in use on the computer.
4. A program to process information to and from terminals for the purpose of computer-assisted guidance. This may be running simultaneously with math, physics or other subject matter instructional programs.

Let's examine the Hardware which is what the computer people call the equipment. When I say computer people, it isn't in reference to little green men, but means the technical and other support personnel necessary for any operation that involves data processing equipment and the programs which are called software.

The computer that is used in Penn State research on computer-assisted instruction and computer-assisted occupational guidance is an IBM 1410. This is a medium-size computer and has 60K words of core storage plus disk files and tape units. Some of these terms

may not mean much to a lot of you, but I want to make the point that it is, at the present, not easy nor possibly desirable for a school to install such equipment. The needed basic research for guidance application, space, air-conditioning, and the cost of equipment and operation places practical utilization sometime in the future. Technological improvements have and will continue to lower costs and make available in the future the special kinds of desirable devices and features counselors need for effective usage of the computer as a tool.

(Slides illustrating the equipment used at Penn State were shown accompanied by an oral description of the equipment.)

Summary of slides:

Student Introduction to System

1. Student talking to counselor requesting information.
2. Student introduced to system by counselor. Student seated at terminal.
3. Student requests information from computer.

Hardware

4. Overall view of terminal.
5. Teleprinter.
6. Closeup of paper feed/Selectric Ball--
7. Rear projection screen.
8. Tape recorder.
9. Bell Dataphone.
10. Computer control console at processing center.
11. Abstract representation of data.
12. Question mark.
13. Data as answers to students questions.

One might ask why not do this or that with a program. The technical problems, problems of a "new" type for an unusual approach to occupational

information, and just plain cost factors have been and will be a restriction for the immediate future. But, research in technology, and in guidance, will reduce or eliminate these problems and someday provide workable systems for the school counselor at a reasonable cost. If I can leave the impression in your mind that the computer should be a tool, an aid for the counselor. You have gotten an understanding of our philosophy.

[Preceding was a twenty minute presentation.]

Some Findings from the Field Experiment with the Computer Based Occupational Information System

A Paper Prepared for the
Annual Meeting of the
American Personnel and Guidance Association

April 7-11, 1968
Detroit, Michigan

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Supported by Funds from the Pennsylvania
Department of Public Instruction
(CoBols 2521)

Background Information on Altoona

The city of Altoona was founded in 1849 by the Pennsylvania Railroad. It's main emphasis was as a center for the construction and repair of railroad equipment and as a transportation and communication link between eastern and western states.

The early 1940's saw a decline in railroad activity and a subsequent decrease in population from 82,000 to 69,000 in 1960. It was at this point that a multi-million dollar redevelopment program was begun. Commercial construction and manufacturing increased. Unemployment declined from a high of 9,100 in 1954 to a low of 3,500 in 1965. All this led to the need for more trained personnel to meet the needs of industry.

In order to partially solve this problem, a 7.5 million dollar vo.-tech. school is in the process of construction and should be ready for occupancy by September, 1971. It will house 1,800 students of which 1,100 or more will come from Altoona. The remaining students will be drawn from the surrounding communities.

Background Information on Student Population

In Altoona, 22% of the students continue their education beyond high school. Seventeen percent of the students indicate a desire to attend vo.-tech. school. General Aptitude Test Battery information obtained from the vocational students that were on our system indicated they were slightly above the median national norm on each of the aptitude areas.

Findings of the Study

The results that will be presented represent the findings from a field trail at Keith Jr. High. They are primarily descriptive as well

as subjective in order to indicate trends rather than any complete statistical analysis. Complete data will be comprehensively analyzed for the final report and can be requested if desired.

The objective data for this paper consists of: 1) the findings from a Values Inventory which we have developed for the study, 2) a comparison of pre-post occupational choices, 3) the relation of the "G" score on the GATB with occupational changes, and 4) the relationship of the occupational information categories, as we defined them for the students, with the values categories. In addition to the objective data described, students were interviewed following the completion of their time on the terminals and their reactions recorded.

One of the prime responsibilities of the project was the development of a number of instruments to measure our findings. The Values Inventory is one and will be discussed in more detail later. An Occupational Knowledge Test was designed to identify any increase in occupational information after being exposed to the system. The Occupational Projections Inventory was developed to allow the student to estimate his potential success in a particular job. Students were also asked to comment on the program as a whole; i.e., equipment, typeouts, idea, etc. Their comments were recorded via the Reaction Inventory. In addition, a validation study was conducted on the GATB and reliability studies on the knowledge test and values inventory have been undertaken.

In the second segment of our objective data, the pre-post occupational choices of the students were studied using Roe's field and level classification as a basis for the analysis. A change in field classification would

indicate a change by the student between one of seven occupational groups, while a change in level designates a within-group change. The subjects (all ninth graders) were grouped into three categories: a) academic students who had no contact with the system, b) vocational students not on the system and c) vocational students on the systems.

It was found that 68% of the academic students showed a change in level between their pre-post choices. In addition, 56% of this change was also among fields. Forty-eight percent of the vocational students not on the system indicated a change in level and 31% of that change also occurred among fields. The vocational students that had an opportunity to participate on the system showed a 40% change in level and a 29% change in field.

The third area of investigation related the level of general intelligence as measured by "G" score on the GATB, with the student's inclination to change his field and/or level of occupational choice after being exposed to the system. The results of this investigation were as follows:

a. There appeared to be no significant degree of change between the students that were exposed to the system and those who were not able to participate.
b. Degree of intelligence, as measured by the "G" score on the GATB, did not appear to affect the amount of change.
c. The degree of field and level change was approximately equal for all groups.
d. For all the groups involved (high and low intelligence for experimental and control group) the change in level was

approximately 75% upward. This may indicate a move away from a realistic choice for those in the low intelligence group, but does not appear to be affected by exposure to the system.

The values instrument designed for the study was an attempt to identify which values appeared to be most important and/or least important for the three groups identified in our study. It is a forced choice, objective inventory, using triads of value statements. The students were asked to select the most important and the least important value in each trial. The values were categorized into seven areas, based on a somewhat similar classification in a study by Gribbons on Lohnes. These seven areas and our findings are:

1. Interest and Satisfaction.

We found a large difference between the academic and the vocational students. The academic students considered interest and satisfaction more important than the vocational students, but both groups considered this value as being important. We found in our interviews of the vocational students following their participation in the project that they explored jobs (or structured occupational information) on the basis of their interests. Moreover, the vocational students on the system considered this value more important than the vocational students not on the systems. One student went so far as to say that, "If you have a job that you like, you have the world by the tail." Additional data from the interviews indicated that the students were almost equally

[1] Gribbons, W. G. and P. R. Lohnes, "Shifts in Adolesents Vocational Values," Personnel and Guidance Journal, November, 1965.

divided between those having expressed an expanded interest in their job potential and those having narrowed or solidified their occupational interests.

2. Advancement.

This value was found to be more important to the vocational students than the academic students. However, exposure to the systems decreased the importance of the value to the vocational students and brought their feelings more in line with the academic students. Yet, a few students mentioned in the interviews that they would like, if not need, more information about ways and means to advancement.

3. Salary.

This was one of the least important value considerations among both academic and vocational students. Exposure to the system did increase the importance of this value to the vocational students although it still remained in the least important category for all. The interviews seemed to back up this feeling as only a few students spoke of salary as being influential in their job exploration.

4. Prestige.

This was the least important value for both groups, with the academic students expressing an even stronger negative attitude then the vocational students. Exposure to the system increased the negative attitude of the vocational students regarding the importance of this value.

5. Personal Goal.

This was the second most important value for both groups (vocational students higher than academic students) although exposure to the system caused this value to decrease slightly in importance for the vocational students.

The consideration of this value is reflected in the students reasons for volunteering for the project. For most it was not to investigate a particular job area, but rather to learn about jobs in general or get a better idea of the kind of job one is suited for. As one student phrased it, he wanted "to see what kinds of jobs there are in life and see what kinds of occupations you could take besides most occupations you find around town." A few were anxious to operate the hardware, as they simply wanted to find out how computers work.

6. Preparation and Ability.

This was the highest valued category among all students, particularly the academic. The vocational students that were on the project showed an increase in importance for this value over the vocational students that were not on the system. During the interviews, though, most students said they were not sure of or aware of their abilities with respect to the nature of the job. Many, even, did not take note of the discrepancies between students' interest, abilities and job requirements which were printed on the type-out sheet. However, a few did try to

relate their talents or abilities to the job, although they didn't take the discrepancy information into consideration. One student said, "It didn't bother me too much, because if you try hard enough you can make it." Several students did note the discrepancy information and considered it to the extent that they either investigated further or they pursued other job explorations.

7. Demand.

The second least important value for both groups with the academic students considering it even less important than the vocational students. Exposure to the system increased the importance of this value for the vocational students although it still remained second least important for them.

The fourth area that we gathered information for involved the relationship of these same seven values categories and the job information categories as they were presented to the students on the systems.

Interest and Satisfaction on the Values Inventory related to the Duties and Working Conditions of the various occupations. It was found that exposure to the system increased the importance of this value to the students. In other words, they were more apt to consider the duties of a job in their explorations and final selections.

Preparation and Ability related to the areas of Training, Education, and Requirements, as they were presented for each occupation. Once again exposure to the system increased the importance of this value to the students. However, it did not seem to be reflected in their cognitive

structure of job information.since most of the students stated that they did relate their abilities to the job requirements.

The salary categories were similar and exposure to the system had a positive affect on the students. Exposure to the system in this case increased the importance of this value.

Advancement categories were the same and this time the treatment had a decreasing affect on its importance. Those students participating on the system found this value to take on somewhat less importance.

The value category of Demand related to the job information category of Employment Outlook as it was presented to the students. Exposure to the system made students more aware of this value, because they showed an increase in their consideration of this particular aspect of job information.

No pertinent information relating to the values of Prestige and Personal Goal were presented on the printouts for the students. Therefore, no comparisons could be made in these two areas.

Student reactions to the system as obtained through the interviews provided some valuable additions to the more objective data just reported.

Most of the students had not thought much about their future occupation or the world of work in general. There were some, however, who had pondered their place in the world of work. Still, in both cases they agreed that they were certainly thinking more now about job opportunities and the necessity of an education. An often mentioned change was that they now believe they have a "better knowledge" about jobs and workers. One student said he is now looking into jobs a little more and working with them to see if he really likes them. As another

student succintly put it, "I thought about it [the job], what I'd feel like in the occupation [while exploring the job]. I actually put myself where that man was." Furthermore, about half of the students were now able to talk with others about jobs and the exploration of occupations.

There was overwhelming agreement that this type of job exploration should take place in junior high. As a student said, "In senior high it's too late to start planning things." Implications here are for either (1) an earlier and more concentrated emphasis on vocational exploration and career decision making processes, or (2) postponement of the curricular decision until high school to allow greater preparatory exploration and investigation in junior high.

Students suggested a number of changes for the system. They felt a definite need for longer periods while at the terminal and perhaps fewer sessions. Few students were able to explore even half of the 40 occupations listed which could have been a reflection of the relatively short period of time the field experiment was in actual operation.

The students indicated a need for a variety of jobs and less information about each to allow for further investigation into his own areas of interest.

They also felt a desire for more control over the terminal. A few other suggested changes were: to show bad points about jobs, provide information on sources that could help give more detail for each group and a desire for more opinions (interviews) from workers on the jobs and a desire to take to a counselor during their terminal sessions.

The students seemed to vary in their method of job exploration. About half felt on-the-job experience was the best way to obtain

information about work, while the rest felt their experience with the computer was the best way to explore jobs. One student who was interested in Carpentry as indicated by his pre-post choices, who went to the counselor for more information about Carpentry and who stated in the interview his preference for Carpentry work--did not, in fact, even explore the occupation of Carpenter that was on the system.

Another student stated he volunteered to see about jobs that would "fit him better". This was indicated by a switch from a pre-choice of Carpentry to a post-choice of Mechanic. He went to the counselor for additional sources of information on Auto Mechanic and he investigated the occupations of Auto Mechanic (twice), Diesel Mechanic and Aviation Mechanic. He also said he noted the typeout discrepancies which caused him to change his mind about considering other jobs.

One-fourth of the students (25 out of 97) did seek additional information from the counselor. When these students were separated into their school's homogeneous grouping, we found only two students from the advanced sections sought additional information. The rest (23) were average or below students who were stimulated to initiate contact with the counselor for more information. This alone does indicate some measure for the continued use of computers for job exploration.

The Pennsylvania State University

The Graduate School

Department of Educational Services

Counselor Education

The Validity of the GATB for Predicting Shop Achievement in Secondary Level Vocational-Technical Education

A Master's Paper in

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by

Jerome Theodore Kapes

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THE PROBLEM, RELATED STUDIES AND BACKGROUND

Stimulated by the Vocational Education Act of 1963, a tremendous growth has taken place in vocational-technical education throughout the nation. With the financial aid provided by this act, many of our states are investing large sums in new or expanded facilities and programs. In Pennsylvania millions of dollars are being spent each year on new physical facilities for vocational-technical education. Forty-seven program plans have been approved as of June 30, 1967. The figures in Table I have been taken from "A Program Report on Area Vocational-Technical School Developments to June, 30, 1967," and will help to show the magnitude of the building program.

Table I

Vocational-Technical School Building Construction Projects in Pennsylvania for the Years 1964 to 1968.

Fiscal Year	Total Cost of Projects
1964 - 1965	$11,088,432
1965 - 1966	15,824,965
1966 - 1967	51,006,706
1967 - 1968 (Projected)	96,674,812

The average pupil size of each of these new schools is 885, which represents an average of 17.9% of the total senior high school enrollment of the participating districts. The average number of course offerings in each school is 21. The type of courses offered range

from the technical level such as Computer Technology and Drafting and Design Technology to the skilled level such as Machine Shop and Trowel Trades. As these schools are completed, they will provide many opportunities for the high school student who is not planning to attend a four-year college to prepare himself for the world of work. The choices available to the student will be much more numerous and flexible than they were in the past.

Along with this increased opportunity provided by the new vocational-technical schools comes added responsibilities for the guidance counselor. It will be his job to provide each student with the information he needs to make the most of the choices available to him. The time of decision for most students will come in ninth grade when he must decide which course of study to follow in high school-- to prepare for college, to prepare for entry into the world of work, or perhaps to prepare for both alternatives. In order to make the most rational decision at this point, a student must understand: the nature and possible consequences of each alternative; his own strengthsand weaknesses, likes and dislikes; and the implications of what he knows about himself as they apply to choosing the most suitable alternative. For the counselor, helping the student to understand the alternatives is perhaps the easiest of the tasks at hand, but to stop here would be leaving most of the job undone.

There are many kinds of things the student should know about himself in order to plan wisely. He needs to understand himself in terms of his aptitudes, skills, knowledge, motivations, values, attitudes, and interests. Information necessary for the student to achieve some understanding of himself can be provided by examination of his cumulative record. This includes his grades in courses he has taken along with

other teacher evaluations. Evaluations by Industrial Arts teachers are often used for those students considering the vocational curriculum. In addition to these sources, tests which measure general scholastic aptitude, other general and specific aptitudes, achievement in specific areas, and interest are also used by many schools. Many of these tests have a long history of relatively successful use for providing information to aid counselors in guiding youth to self-understanding.

Even if one were to assume, however, that understanding of the alternatives and understanding of self has been achieved by the student with the aid of his counselor, is the task complete? There remains the problem of establishing a relationship between the two understandings prior to the act of choosing.

What, then, is the responsibility of the counselor at this final stage of one of the first of a series of such processes? Undoubtedly his primary responsibility is to avail himself of that information which will be most meaningful to the student when faced with the task of relating self to education and work.

The purpose of this study is to investigate the usefulness to the counselor of one of the many important kinds of information needed to perform the task--the validity of various aptitude measures administered in the ninth grade in predicting achievement in selected secondary level vocational and technical programs. The primary reason for focusing on the validity of aptitude measures at this time is the impending availability for use by qualified school personnel of the General Aptitude Test Battery (GATB).

The very practical decision of schools whether or not to adopt the procedure of administering the GATB to their ninth graders for

guidance purposes should be influenced by evidence of its predictive validity. Admittedly, the evidence uncovered by this investigation is not, nor should not be, conceived to be conclusive. Its values can only be measured in relation to the interest it may provoke in conducting other studies of its type and its contribution to the more inclusive body of knowledge which may result.

Review of Related Literature

The General Aptitude Test Battery (GATB) has had a long history of development and research involving the validation of its use for vocational counseling. Many of these studies were specifically designed to investigate its usefulness in predicting success on the job, others in predicting academic achievements, while some were designed to predict success in training situations. In order to get a comprehensive look at what has been done in the past, the reader is referred to the General Aptitude Test Battery, Section III: Development, U. S. Department of Labor, October, 1967. Some of the studies or articles cited there are pertinent to this investigation and are briefly reviewed here. Many other references may be found in the "Section III" publication, however, which have not been included in this review. The only references selected for mentionin this paper were those which either directly or indirectly pertained to the validity of the GATB when used with ninth grade students to predict success in a secondary level vocational or technical program.

Dvorak (1956) reported on the GATB in one of a series of articles describing various aspects of multifactor aptitude tests appearing in the Personnel and Guidance Journal (PGJ). Super, in his comments which followed at the end of Dvorak's article, pointed out what he felt were the weaknesses and strong points of the GATB and offered several suggestions

for its further improvement. Since that time much of what Super recommended has been accomplished and more recently Super has stated (Super and Crites, 1962):

> The first edition of this text was both enthusiastic about the promise of this battery and critical of the paucity of data made available in the manuals and in other publications to justify the battery's proposed use. In two revisions of the manuals and in a large number of journal articles, Dvorak and her collaborators have since provided the empirical evidence needed for the evaluation and use of the test battery; in their current form they are a model of completeness and of clarity.

Samuelson (1956) using a sample of 136 males over 16 years of age from the Area Vocational Schools in Salt Lake City, Utah, studied the GATB's use for predicting success of vocational school students in Auto Body, Auto Mechanics, Carpentry, Diesel Mechanics, Electronics and Welding. The criteria used were developed from instructors' ratings of performance in theory class, shop work and of personal characteristics. To establish the reliability of the ratings, students were evaluated at the end of ten weeks and again four weeks later. Reliability of ratings were reported as quite high. The three criteria, however, were found to be highly intercorrelated and were therefore combined.

It was arbitrarily decided to select a three aptitude composite to correlate with the criterion for each shop. The basis for their selection was: (1) The aptitudes had no common sub-test; (2) the first two aptitudes selected were those with the highest correlation with the criterion; and (3) the third aptitude was chosen on the basis of face validity and significant correlation with the criteria. Using this procedure, three aptitudes were selected for all but Auto Body for which only two were reported. Multiple correlations ranged from .508 to .827 within all shop areas, and were significant for all areas except Diesel Mechanics and Welding.

Culhane (1964) in a brief article describing the release of the GATB by the United States Employment Service (USES) and its subsequent use in schools, pointed out that as of 1964 the GATB had been released to 600 schools in 36 states. She also suggested in the article that at the ninth grade level the GATB should be used both to broaden occupational horizons and for making curricular choices.

Wysong (1965) has described some of the recent developments concerning the GATB and has also made some suggestions for its use in grades nine and ten. He described a procedure initiated by the Ohio State Department of Education for cooperating with the Ohio State Employment Service to make the GATB available for use in ninth and tenth grades. He went on to point out that the GATB obviously could not be used in the same manner with ninth and tenth grade students as it was used by the employment service. Possible ways were suggested in which the GATB could be used by school counselors in grades nine and ten. Wysong saw the need for interpretative materials which would enable the counselor to emphasize a "developmental guidance and counseling theme". "The use of the GATB in grades nine and ten should stress (1) self-understanding, (2) motivating and orienting, (3) discovering clues, and (4) exploring opportunities."

Droege (1965) reported on a study designed to investigate the extent to which occupational test norms validated on an adult sample would predict success of high school students in vocational courses. Norms developed in 1953 for compositors in the printing trade consisting of the aptitudes Intelligence (G), Verbal (V), Clerical Perception (Q), and Manual Dexterity (M) were used. The study was conducted in 1963 by the Indiana State Employment Service, and the sample consisted of 70 ninth grade

students. Instructors' ratings one year after entering the program were used as the criterion of success on a dichotomized basis of Good and Poor. The cutting scores were adjusted for maturation on the basis of previous research findings. The multiple correlation between the four aptitude scores based on the 1953 norms and the dichotomized criterion was .38, significant at the .01 level. Droege suggested further research of this nature.

Ingersoll and Peters (1966) investigated the use of the GATB to predict the grade point averages of freshmen and sophomores in academic and vocational classes in the Ohio secondary schools. The sample consisted of 4,000 ninth and tenth grade boys and girls. Multiple correlation, analyses were undertaken. Intelligence (G) correlated most highly (.60) with the criterion for the entire sample. Although many academic areas were studied, the only non-academic areas studied were Industrial Arts and Home Economics on the ninth grade level and Industrial Arts, Home Economics, Mechanical Drawing and Art on the tenth grade level. Several Business courses were also included. In most cases the GATB significantly predicted the criteria in the above mentioned non-academic courses. The composite of Form Perception (P) and Verbal Aptitude (V) correlated significantly with Mechanical Drawing success (.621). The authors also make the observation that few students in the sample studied were taking vocational and commercial courses and that they found very little literature concerning the use of the GATB in junior-senior high school.

Droege (1966) reported the results of a study on maturation to improve the usefulness of the GATB with high school students. The most significant findings were that stability coefficients increased from

ninth to eleventh grades. In ninth grade, stability coefficients were highest for General Intelligence (G), .79, Verbal aptitude (V), .79, and Numerical Aptitude (N), .77. The lowest stability coefficient was for Finger Dexterity (F), .57. The use of Occupational Aptitude Patterns (OAP's) with ninth grade students was questioned as a result of the low stability coefficients obtained. In order to partially overcome the problem it was recommended that cutting score bands equal to plus or minus one standard error of measurement be used in order to increase the stability of OAP's. When using OAP's with students in the lower high school grades, it was further recommended that interpretation be restricted to those individuals whose scores fall outside the band. More research of this nature can be found in Chapter 19 and 20 of the GATB manual "Section III" on development.

After a relatively exhaustive search of the published literature, the studies reported were the only investigations utilizing the GATB found to be related to the problem under examination in this paper. Because of the scarcity of pertinent evidence, it would be impossible to draw any decisive conclusions with reference to the value of the GATB in predicting secondary level vocational or technical program achievement.

Further investigation of the literature was undertaken in order to determine the predictive efficiency of the GATB as compared to another aptitude battery which enjoys widespread usage in the schools, the Differential Aptitude Test (DAT). Such comparable data is considered to be essential in adequately evaluating the potential use of the GATB for vocational counseling in the lower high school grades.

Stoughtor (1955) studied the DAT in relation to differential prediction of various measures of success in Connecticut technical schools.

The sample included students in the ninth grade in ten Connecticut technical schools. The criteria of success were grade nine and grade eleven marks in both general education and shop subjects. Shops studied were Auto, Carpentry, Drafting, Electrical and Machine. The Verbal and Numerical scores of the DAT showed a high correlation with both general education and shop course grades. The clerical and spelling test showed little relationship for predicting success. The Abstract, Space, and Mechanical aptitude scores were more useful for predicting the shop criteria than they were for predicting general education success. Results of the study indicate that further research is necessary before the DAT can be used to make differential predictions of the probability of success in training programs.

Doppelt, Seashore and Odgers (1959) studied the usefulness of the DAT in predicting success for auto mechanics and machine shop students on the high school level. The sample consisted of 285 eleventh grade students in seven schools in Ohio. These students were tested again in twelfth grade. The criterion consisted of instructors' ratings on four traits. These traits were: (1) Understand Trade Information, (2) Job Know-How, (3) Quality of Work, and (4) Quantity of Work. Grades were not used because of the difficulties encountered in combining data from seven schools. Correlations were reported in tabular form between each trait and each aptitude test included in the DAT. The correlations were computed separately for each grade level and for each of the two shops studied. For Auto mechanics no outstanding high correlations were found. For machine shop, significant correlations were obtained. The best predictor of the combined criteria in machine shop was obtained by using the sum of the scores on three tests: Abstract Reasoning, Space Relations,

and Mechanical Reasoning. This combination yielded correlations of .52 for eleventh grade and .53 for twelfth grade machine shop students. For maximum usefulness, it was suggested that the data obtained from the machine shop sample be converted to expectancy tables.

Foote (1960) studied the prediction of success in a secondary school program of auto mechanics using verbal and non-verbal I.Q., three mechanical aptitudes, an arithmetic and reading test and the Kuder. The sample consisted of 435 beginning students. Two dichotomous and ten continuous criteria were used as a measure of success. It was found that the arithmetic test, DAT Mechanical Reasoning, SRA Mechanical Aptitudes (Spatial Relations and Mechanical Knowledge parts) and the Kuder Persuasive scale were significant predictors of graduation, continuation in the program, performance test scores and related subjects grades. Shop grade averages were the most poorly predicted criterion with a multiple R of .25 over the three year period obtained from the arithmetic test and the DAT Mechanical Reasoning test.

In summary, the research and other articles briefly reviewed here tell only part of the story of what has been done in the past. The much larger task undertaken by the employment service and numerous other individuals to investigate the validity of the GATB for use in vocational counseling (reported in the Section III volume) is monumental and stands as a tribute to their efforts. However, there is still much to be done. With the GATB now available for use with students in the lower high school grades many new opportunities for needed research present themselves. The most likely place to conduct much of this research is in the area of vocational-technical education. It is obviously essential to gather as much evidence as possible at this time to demonstrate the relative

effectiveness of the GATB for school use. The purpose of this study is to conduct the first phase of a longitudinal effort designed to reveal pertinent data.

Background of the GATB

Since this study was conducted to uncover evidence which may be used by guidance personnel in the schools, a brief description of the GATB will be presented at this point. Although many school counselors have some information pertaining to the GATB, few have had the opportunity either to administer the test or to interpret the resulting scores. The material presented in this section has been included to help the school counselor understand the potential uses of the GATB with ninth graders.

The GATB is not a new test. It was first released by the USES in 1947 for use in employment counseling (primarily with adults). The first edition of the GATB (B-1001) contained 15 sub-tests and was designed to measure 10 aptitudes. As an outgrowth of research findings based on the first edition an improved version (B-1002) was released in 1952, which contained 12 sub-tests and was designed to measure 9 aptitudes. In the revised edition, several sub-tests which were found to contribute an insignificant amount to the measurement of certain aptitudes were dropped in order to reduce administration time. As a result of their elimination, Aptitude Aiming or Eye-Hand Coordination (A) and Motor Speed (T) were combined to form the aptitude Motor Coordination (K) which is based on only one sub-test. The revised edition is made up of 8 paper-and-pencil sub-tests and 4 apparatus sub-tests. Seven of the paper-and-pencil sub-tests can be machine scored. The entire battery takes about two and one quarter hours to administer. The revised

battery currently in use has been designed to measure the following aptitudes:

G - Intelligence--General learnings ability. The ability to "catch on" or understand instructions and underlying principles; the ability to reason and make judgements. Closely related to doing well in school.

V - Verbal Aptitude--The ability to understand meaning of words and to use them effectively. The ability to comprehend language, to understand relationships between words and to understand meanings of whole sentences and paragraphs.

N - Numerical Aptitude--Ability to perform arithmetic operations quickly and accurately.

S - Spatial Aptitude--Ability to think visually of geometric forms and to comprehend the two-dimensional representation of three-dimensional objects. The ability to recognize the relationships resulting from the movement of objects in space.

P - Form Perception--Ability to perceive pertinent detail in objects or in pictorial or graphic material. Ability to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.

Q - Clerical Perception--Ability to perceive pertinent detail in verbal or tabular material. Ability to observe differences in copy, to proofread words and numbers, and to avoid perceptual errors in arithmetic computation.

K - Motor Coordination--Ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed. Ability to make a movement response accurately and swiftly.

F - Finger Dexterity--Ability to move the fingers, and manipulate small objects with the fingers, rapidly or accurately.

M - Manual Dexterity--Ability to move the hands easily and skillfully. Ability to work with the hands in placing and turning motions.

Raw scores from the test are converted to standard scores which have a mean of 100 and a standard deviation of 20 based on adult norms. In 1959 norms were first released for ninth and tenth grade. On the basis of data collected since that time and on maturation studies by Droege (1966)

new normative information for ninth and tenth grade was released in 1966.

Occupations which require similar aptitudes have been grouped together to form Occupational Aptitude Patterns (OAP's). Each OAP consists of three of the nine aptitudes found to be significant for that family of occupations. The three significant aptitudes are reported in terms of cut-off scores, the minimum scores found to be essential to successful performance in the occupation. The most recent publication of norm data was released in June, 1966, and included 36 OAP's which covered over 850 occupations. For each OAP there are reported not only adult norms bur norms for grade nine and grade ten as well. Droege (1966) points out that OAP's for both ninth and tenth grades should be used with cutting score bands equal to plus or minus one standard error of measurement. In addition, he suggests that interpretation should be restricted to those individuals whose scores fall outside the band when using OAP's with students from the lower high school grades.

Until recently the USES completely controlled the administration of the GATB. When the test was given to secondary school students, it was administered by a qualified employment service representative. With the development of ninth and tenth grade norms and increased interest on the part of the schools the USES established a policy that the senior state officers in each state may release the GATB Form-B-1002 to secondary schools. It is in the light of this new policy that this study was undertaken.

Statement of the Problem

The specific purpose of this study was to compare the validity of

the GATB to the validity of the aptitude measures currently used in Altoona, Pennsylvania in predicting first semester shop grades for a sample of tenth grade boys. The aptitude measures currently used in Altoona for counseling ninth grade boys who are anticipating their entrance into the senior high school vocational program are the Academic Promise Test (APT) and the language part of the California Test of Mental Maturity (CTMM). Because of the small number of students from the selected sample enrolled in each shop area it was necessary to combine several shops together to form three groupings or levels. Working within this framework the following questions were formulated:

1. For each of the three groupings (Level I, II and III) and for the total sample:

   a. What is the validity of the GATB for predicting achievement as compared to the validity of the composite (APT-CTMM) now being used?

   b. Does the use of the GATB manipulative aptitudes (K, F and M) as predictors increase the validity of the GATB?

   c. Does the use of the two predictor composits combined (APT-CTMM and GATB) result in an increase in predictive efficiency as compared to using the measures separately?

2. What effect does combining the three groupings (Level I, II and III) have on the validity of both the GATB and the composite APT-CTMM in predicting achievement?

PROCEDURE

Subjects

The sample for this study consisted of male students in the tenth grade enrolled in the Altoona Area Vocational-Technical School. Test data was gathered during the previous two years when the students were attending Keith Junior High School in Altoona. In September, 1965, as

eighth graders, all of the students in the school received the language part of the California Test of Mental Maturity (CTMM). In December of the following year when those same students were in ninth grade they were given the Academic Promise Test (APT). In addition to the CTMM and the APT, those students who expressed an interest in enrolling in the vocational curriculum in high school were given the GATB form B-1002 in April of their ninth grade year. The number of students tested with the GATB at that time was 112. At the time the criterion was obtained, which was at the end of the first semester of the tenth grade year, 92 students with complete data remained in the sample. Of the 20 students lost, approximately half were not enrolled in the vocational curriculum and the remainder were lost due to incomplete data. This sample of 92 students comprised approximately one-fourth of the total number of tenth grade students enrolled in the vocational curriculum in Altoona.

There were 14 different vocational shops in which the 92 students were enrolled, but because the number of students from the sample in each shop was small it was necessary to group several shops together. This was done in such a way as to obtain the maximum homogeniety within each group while achieving a sufficiently large sample size. Three levels were decided upon and included the following shops: Level I (N=22) - Computer Technology and Drafting and Design Technology; Level II (N=35) - Auto Mechanics, Electricity, Machine and Printing; Level III (N=35) - Auto Body, Carpentry, Home Appliance Repair, Planing Mill, Plumbing, Sheet Metal, Trowel Trades and Welding. The percentile equivalents of the individual GATB aptitude scores for each level are given in table II.

TABLE II

Percentile Equivalents of Mean GATB Scores Based on 9th-Grade Norms*

	Aptitudes								
Level	G	V	N	S	P	Q	K	F	M
I N = 22	68	50	74	71	80	64	71	62	71
II N = 35	46	42	53	49	55	48	50	41	50
III N = 35	46	41	54	48	52	50	47	41	46
Total N = 92	50	44	58	54	60	53	54	46	53

*Percentile equivalents are approximations based on Table III of the <u>Manual for the General Aptitude Test Battery</u>, <u>Section II</u>: Norms.

Criterion

Course grades assigned by the shop instructor at the end of the first semester were selected as the criterion for this study. Grades were assigned on a 5 point scale with an "A" worth 5 points and "F" worth 1 point. As has been previously indicated, it was necessary to combine several shops in order to obtain sufficient sample size for analysis. In order to eliminate differences among teachers' grading systems within a grouping formed by combining several shops, standard scores with a mean of 500 and a standard deviation of 100 were used. The number of students included in the 14 shop areas ranged from 12 to 57 with an average of 25 students per shop. The following rationale was used as a basis for converting the grades of each of the 92 students in the sample to standard scores.

The necessary characteristic of achievement measured by grades is that a particular grade such as "C" obtained by one member of the sample is equivalent to a "C" obtained by another member of the sample. Since the shops were grouped to attain a sufficiently large sample size this characteristic was lost. (The "C" obtained by a student in shop X might have been the lowest grade given by the instructor in shop X, whereas the "C" obtained by a student in shop Y might have been at the median of the distribution of grades given by the instructor in shop Y.) In convertingto a standard score distribution, information about the actual grade received by a student was given up so that equivalency of the achievement measured could be attained. (The score of 500 attained by a students in shop X is considered to be the equivalent of a score of 500 attained by a student in shop Y relative to each of the student's standing in his shop area).

Analysis

Multiple regression analysis was used for each of 12 separate sub-problems. The 12 sub-problems conisted of an analysis of each of the four groupings (Level I, II, III and the entire sample) for the GATB composite alone, the APT-CTMM composite alone and for the composites combined (GATB and CTMM). Multiple regression was carried out using the procedure of elimination of variables by parsimony. This method compares the amount of predictable variance using a composite composed of all predictors less one (the least contributing predictor). If a non-significant loss of predictable variances occurs, the new composite is compared to a succeeding one in which two variables (the two least contributing predictors) are eliminated. Predictors are eliminated one by one until either only one remains, or a significant loss in prediction occurs.

From the results of previous research it was hypothesized in this study that utilizing the .01 level of significance as the criterion for reducing the size of the prediction composite would result in the elimination of all but one of the predictor variables for each of the sub-problems. For the purposes of this study, then, significant findings would be reported in terms of a number of zero-order correlations in addition to multiple correlations. If this, in fact, was the case it would then be possible to investigate the effect of sample size on question #2--the comparison between predicting achievement within levels and predicting combined achievement of the total sample.

The technique utilized in determining the effect of sample size (a reflection of the representativeness of the sample statistic to the population parameter ρ (rho) is to calculate 95% confidence intervals for the zero-order correlations using Fisher's z-transformation. The resulting ranges could then be examined for amount of overlap.

RESULTS

The results of this study are reported here in terms of the following questions posed in the statement of the problem.

Question #1 - For each of the three groupings (Level I, II and III and for the total sample:

Part a - What is the validity of the GATB for predicting achievement as compared to the validity of the composite (APT-CTMM) now being used?

Part b - Does the use of the GATB manipulative aptitudes (K, F and M) as predictors increase the validity of the GATB?

Part c - Does the use of the two predictor composites combined (APT-CTMM and GATB) result in an increase in predictive efficiency as compared to using the measure separately?

Question #2 - What effect does combining the three groupings (Level I, II and III) have on the validity of both the GATB and the composite APT-CTMM in predicting achievement?

Question # I - Part a

What is the validity of the GATB for predicting achievement as compared to the validity of the composite (APT-CTMM) now being used?

Table III for the GATB, and table IV for the APT-CTMM show the multiple R's between each of the composites and course grades at each iteration in the parsimony program for all four groupings. Zero-order correlations with the most significant predictor appears at the bottom of each table. Comparing the two composites using all of the predictors in each composite, the multiple R's for the GATB are as follows: Level I, .69; Level II, .64; Level III, .55; and total sample, .33. For the APT-CTMM: Level I, .49; Level II, .61; Level III, .44; and total sample, .41. The data indicates that when considering each composite as a whole, the

TABLE III

Multiple Correlations Between the GATB Composite and Course Grades at Each Iteration for the Four Groupings

Number of Predictors Eliminated	Level I N = 22		Level II N = 35		Level III N = 35		Total N = 92	
	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R
0	None	.69	None	.64	None	.55	None	.33
1	G	.69	M	.64	P	.55	N	.33
2	P	.69	Q	.63	V	.54	V	.33
3	F	.69	P	.62	G	.54	P	.33
4	M	.68	N	.61	K	.53	Q	.33
5	N	.67	S	.60	F	.52	F	.33
6	V	.65	V	.58	Q	.50	S	.32
7	Q	.61	F	.54	S	.45	K	.31
8	S	.59	K	.42	M	.35	G	.25
Zero-Order Correlation With Most Significant Predictor	K	.59	G	.42	N	.35	M	.25

TABLE IV

Multiple Correlations Between the APT-CTMM Composite and Course Grades at Each Iteration for the Four Groupings

Number of Predictors Eliminated	Level I N = 22		Level II N = 35		Level III N = 35		Total N = 92	
	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R
0	None	.49	None	.61	None	.44	None	.41
1	Num	.49	Num	.61	CTMM	.44	Lang	.41
2	Lang	.48	Ver	.60	AR	.42	Num	.40
3	Ver	.45	CTMM	.54	Lang	.39	CTMM	.35
4	AR	.39	Lang	.48	Ver	.27	Ver	.33
Zero-Order Correlation With Most Significant Predictor	CTMM	.39	AR	.48	Num	.27	AR	.33

GATB composite yields the higher multiple correlation with the criterion at each of the three levels. For the total sample, however, the APT-CTMM composite yields the higher multiple correlation.

However, because the GATB composite contains nine predictors and the APT-CTMM composite has only five predictors, the GATB can be expected to show higher multiple R's. (Everytime a variable is added the multiple R can be expected to increase.) By looking at only the zero-order correlation with the most significant predictor for each of the four groupings this problem is eliminated. Analyzing the data in this manner produces a correlation which is greater for the GATB at level I (correlation between GATB K and criterion .59) and level III (correlation between GATB N and criterion .35). Zero-order correlation is greater for the APT-CTMM at level II (correlation between APT-CTMM AR and criterion .48) and for the total sample (correlation between APT-CTMM AR and the criterion .33).

Because of the different results obtained from looking at the data in different ways, it was decided to attempt another approach which might be more meaningful than either of the two already considered. In order to accomplish this it was decided to view each composite in terms of the multiple R's yielded by taking the three most significant predictors for each grouping. This approach was selected because it was apparent that the three most significant predictors accounted for almost all of the predictable variance and what remained may well have been due to chance. Table V shows the multiple R's for the three predictor aptitudes that resulted from this analysis.

Question # I - Part b

Does the use of the GATB manipulative aptitudes (K, F and M) as predictors increase the validity of the GATB?

TABLE V

Multiple Correlation Between the Three Most Significant Predictors and Course Grades for the GATB Composite, APT-CTMM Composite and the Combined Composite

	GATB		APT-CTMM		GATB and APT-CTMM	
	Three Most Significant Aptitudes 1 2 3	Multiple R	Three Most Significant Aptitudes 1 2 3	Multiple R	Three Most Significant Aptitudes 1 2 3	Multiple R
Level I	K, S, Q	.65	CTMM, AR, VER	.48	K, CTMM, VER	.69
Level II	G, K, F	.58	AR, LANG, CTMM	.60	G, LANG, AR	.65
Level III	N, M, S	.50	NUM, VER, LANG	.42	N, G, K	.46
TOTAL	M, G, K	.32	AR, VER, CTMM	.40	AR, M, VER	.41

In an attempt to answer this question it was decided to look again at the three most significant predictors of the GATB for each of the four groupings. The three most significant predictors (aptitudes) are listed as part of Table V. The data shows that the manipulative aptitudes (K) in level I and (M) in the total sample are the most significant predictors in each grouping. For level II and for the total sample two of the three most significant predictors are manipulative aptitudes. Of the twelve most significant predictors for the four groupings, six or one-half are manipulative aptitudes although the manipulative aptitudes comprise only one-third of the battery. Among all of the aptitudes, motor coordination (K), which appears in all but one of the four groupings as one of the three most significant aptitudes, makes the highest contribution in predicting shop achievement.

Question # I - Part c

Does the use of the two predictor composites combined (APT-CTMM and GATB) result in an increase in predictive efficiency as compared to using the measures separately?

The results of combining the two predictors appear in Table VI. It becomes apparent by comparing Tables III and IV to Table VI that combining the two composites does yield multiple correlations which are higher than for either of the two composites taken separately. However, in order to justify the use of 14 variables for predicting shop achievement it must be demonstrated that each of the predictors make a significant contribution. Looking at the columns of multiple R's for each grouping, it becomes evident that less than half of the predictors bare even discernible weights in terms of prediction. Also, by looking at Table V and comparing the multiple R's for the three most significant predictors

TABLE VI

Multiple Correlations Between the Combined Composite (GATB and APT-CTMM) and Course Grades at Each Iteration for the Four Groupings.

Number of Predictors Eliminated	Level I N = 22		Level II N = 35		Level III N = 35		Total N = 92	
	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R	Predictor Eliminated	Multiple R
0	None	.79	None	.77	None	.67	None	.46
1	G	.79	CTMM	.77	S	.67	S	.46
2	S	.79	M	.77	P	.67	K	.46
3	Num	.78	Ver	.77	Num	.67	F	.46
4	F	.78	Q	.77	Q	.66	N	.46
5	AR	.78	N	.77	CTMM	.66	Q	.46
6	P	.76	P	.76	F	.65	P	.46
7	Lang	.74	V	.75	M	.64	G	.46
8	V	.73	S	.75	Lang	.62	Lang	.45
9	N	.72	F	.73	V	.58	Num	.45
10	Q	.71	Num	.71	Ver	.56	V	.44
11	M	.69	K	.65	AR	.46	CTMM	.41
12	Ver	.63	AR	.55	K	.40	Ver	.39
13	CTMM	.59	Lang	.42	G	.35	M	.33
Zero-Order Correlation With Most Significant Predictor	K	.59	G	.42	N	.35	AR	.33

in the combined composite with those of each of the composites taken separately, only a slight increase in the multiple correlation is evident. In the case of Level III there is actually a decrease in multiple correlation.

Question # 2

What effect does combining the three groupings (Level I, II, and III) have on both the GATB and the composite APT-CTMM in predicting achievement?

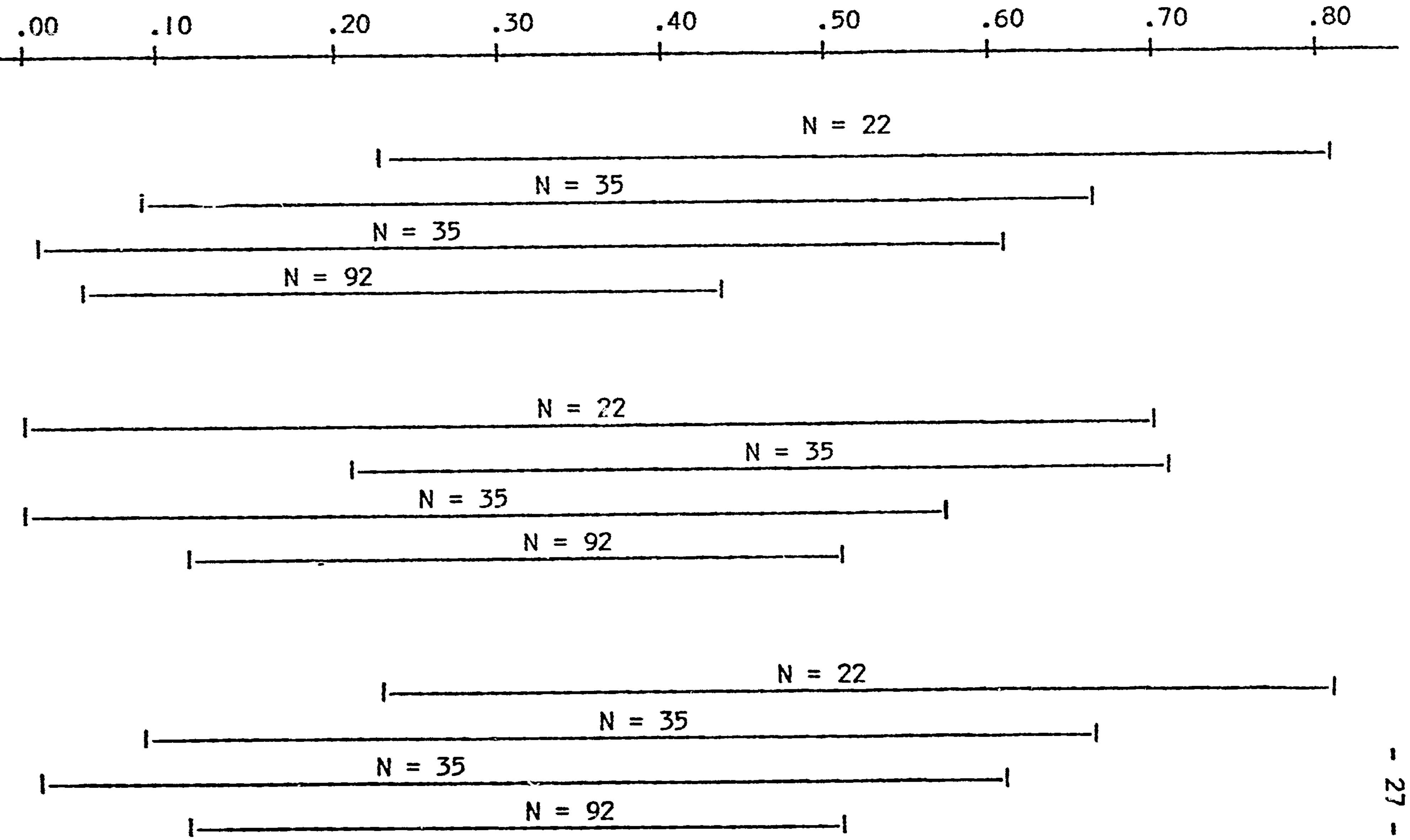
By looking again at Table III for the GATB and Table IV for the APT-CTMM, it is apparent that combining the sample has the effect of lowering the multiple correlation between each composite and the criterion. Considering the total multiple R's, it can be seen that the GATB atains a higher multiple R at each of the levels but drops below the APT-CTMM when the sample is combined. However, because of the difference in the number of predictors in each composite as was pointed out earlier, it was again decided to consider only the three most significant predictors in each composite. Using this approach, the data in Table V shows that there is a much greater reduction in multiple R for the GATB than for the APT-CTMM when the sample was combined.

Caution should be used in making this interpretation because the precision of measurement is not as great when working with the smaller sample numbers in the divided sample. To determine the effect of a larger sample number, the zero-order correlations between the most significant of the predictors and the criterion for each of the groupings were examined using 95% confidence interval. The amount of overlap between confidence interval bands for the total sample and each of the three levels can be compared to determine the effect of sample size on each composite. Table VII shows 95% confidence interval for the zero-order correlation. When combining the three levels for the GATB composite, a loss of predictive validity

TABLE VII

95% Confidence Intervals for the Zero-Order Correlations Between Course Grades and the Most Significant Predictor for Each Level of the Analyses

Category and Level	Most Significant Predictor	Correlation
GATB		
Level I	K	.59
Level II	G	.42
Level III	N	.35
Total	M	.25
APT and CTMM		
Level I	CTMM	.39
Level II	AR	.48
Level III	Num	.27
Total	AR	.33
COMBINED		
Level I	K	.59
Level II	G	.42
Level III	N	.35
Total	AR	.33



is apparent. Comparing the confidence band for the total sample with the confidence bands for each of the levels the amount of overlap ranges from approximately half the total sample band for Level I to complete overlap of bands for Level III. Following the same procedure for the APT-CTMM composite, it is evident that for Level I and III there is complete overlap and at Level II there is approximately 75% overlap. Interpreting these results, it appears that there is greater loss of validity for the GATB composite than for the APT-CTMM composite when the three levels were combined.

SUMMARY AND CONCLUSIONS

This study has attempted to evaluate the usefulness of the GATB in providing valid information to ninth grade students who are considering entrance into the senior high school vocational curriculum. The investigation was prompted by the recent decision of the United States Employment Service to release the GATB for use by qualified school personnel. The study was conducted using a sample of 92 tenth grade boys in the 14 vocational shops in the Altoona Area Vocational-Technical School. The students had been tested with the language part of the CTMM in September, 1965 and the APT in December, 1966. The GATB form B-1002, was administered in April of 1967. the criterion of prediction was a student's shop grade assigned by his instructor at the end of the first semester in the vocational curriculum (January, 1968).

Because of the small number of students from the total sample enrolled in each shop, the 14 shops were combined into three relatively homogeneous groupings. Each of these groupings and the total sample

were analyzed using the GATB composite alone, the APT-CTMM composite alone and the two composites combined. Both multiple correlations and zero-order correlations between the criterion and selected predictors were calculated. The following results were obtained:

1. When the sample was divided into relatively homogeneous groupings the GATB possessed greater validity for predicting shop achievement than did the APT-CTMM composite. When the groupings were combined, the APT-CTMM composite appeared to have more validity for predicting shop achievement than did the GATB.
2. The GATB manipulative aptitudes (K, F and M) made a significant contribution to the validity of the GATB for predicting shop achievement.
3. Using both the GATB and the APT-CTMM combined resulted in very little increase in predictive efficiency as compared to using either measure separately.
4. Combining the three goupings resulted in a loss of validity for predicting shop achievement which was greater for the GATB than for the APT-CTMM composite.

Based on the findings of this study it appears that the GATB does provide useful information for the ninth grade student who is contemplating entrance into the senior high school vocational curriculum. When shop areas were grouped together, the GATB was no better for predicting shop achievement than some of the other measures currently used. However, predicting shop achievement in general may not have any meaning for the student who is making a decision to enter a particular shop. If prediction is restricted to one shop or a group of closely related shops it appears that the GATB possesses predictive validity superior

to the measure currently used. Assuming, then, that the results of this study bear consideration, the GATB is most useful to the counselor in providing some of the information a student needs to choose from among the many vocational shops available to him.

Some comparisons can be made between this study and some of the studies cited in the review of the literature. On the basis of results reported by Samuelson (1956) and Ingersoll and Peters (1966) it appears that multiple correlations of .50 or better using three significant predictors can be considered high when predicting shop grades with the GATB. Foote (1960) using the DAT and several other tests found shop grades the most poorly predicted criterion among the criteria used (multiple R, .25 using two predictors). Droege (1965) using a dichotomized criterion of good and poor grades obtained a multiple R of .38 using four GATB aptitudes. Considering the fact that these studies analyzed each shop separately the multiple correlations obtained in this study are at least as high as could be reasonably anticipated.

It is hoped that this study will provide a stimulation for further studies that will add to the useful information provided by this and previous endeavors. For studies which might follow, it is recommended that each shop in a vocational program be analyzed separately using sufficiently large samples. It may also be recommended that for the purpose of comparing the predictive value of the GATB with the predictive value of some other measure that both predictors be administered at about the same time. It should be considered that both the type of skills to be learned as well as individual student's aptitudes may change between the student's first semester in a training program and the time he takes his first job. For this reason, longitudinal studies

should be undertaken which could include prediction of first and third year performance as well as success on the job.

Possible studies which might be undertaken could evaluate the GATB as compared to other aptitude measures currently in common use such as the DAT. From the findings of this study, it can be hypothesized that the GATB is superior to other aptitude measures in predicting shop achievement because it contains manipulative as well as cognitive aptitudes. Its value to counselors may thus lie in its ability to assess youngster's potential motor skill development.

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Implementation Problems:
Counselor Acceptance of Systems

A Paper Prepared for the Fourth Symposium
of Systems Under Development in
Vocational Guidance

American Institute for Research
Palo Alto, California

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March 9, 1968

No more than two minutes after I had mailed John Flanagan's preference sheet for the symposium back to him some time during the beginning of December, indicating I would be willing to prepare a position paper on the topic of "Implementation Problems: Counselor Acceptance of Systems" I wished I could have gracefully withdrawn. At that time I really couldn't think of a way to approach the implementation problem prior to the completion of the development, nor even conceptualization of the kinds of systems we have been discussing for a couple of years now. But I was somewhat heartened when I read the tentative program which indicated that Roger Myers would prepare a paper on "Implementation Problems: Training Counselor Users." That particular item gave me a real psychological boost, since Roger must not only reach into the unknown and come up with something concrete but also manage to formulate a counselor training program based on his interpretations.

One of the crucial questions that must be answered in discussing implementation is, "Is it the implementation of the experimental prototypes in which we're primarily interested, or the eventual highly developed models of the future?" Let's examine the implications of the alternatives. In the former case we become involved in obtaining the cooperation of practicing counselors who have probably received their masters degrees from our institutions and who we've already identified as future doctoral students in counselor education. We are primarily concerned with getting the "best" people with the "best" ideas to cooperate with us in the development and trials of our tentative models. Ten or twelve interested and highly qualified counselors would be most adequate in the majority of situations to satisfy our needs at the prototype stage.

As we design, try out, tentatively evaluate, revise, re-try, etc. these tentative systems models in a highly cooperative school setting we become absorbed in the task of developing the "ideal" guidance support system for this peculiarly innovative environment. The application of our efforts beyond this willing and cooperative climate would appear to be quite limited. Thus the guidance support systems designer finds himself in a somewhat awkward situation regarding implementation.

In listing the stages of development and examining the degree of counselor acceptance at each stage I believe this particular situation will be clarified.

1. Development of first generation prototype--acceptance by general population of counselors extremely limited (no trial data nor counselor-student feedback available); counselors who would be willing to assist in trials are those who have had prior relationship with support systems designers and who possess a high degree of acceptance of any new approach.
2. Counselors identified in the first stage become involved in planning of trial.
3. Trial undertaken and completed.
4. Feedback obtained from both students and counselors involved in field trial.
5. Prototype system revised and/or expanded based on feedback, or in fact abandoned.

6. Development of second generation prototype--aceptance by general population of counselors increases but limited to those who are most highly acceptable to any new approach; some generation of interest among remainder of counselors.
7. The planning of trial, actual trial, feedback and revision is repeated with a somewhat larger group of counselors involved.
8. Future generations of prototypes proceed, each resulting in a higher degree of counselor acceptance. This acceptance is limited only by the occurrences in stages four and five, the feedback and further revision stages--the feedback upon which the revisions are based always proceed from an atypical environment. At each stage of development the increased counselor acceptance is probably due merely to the demonstration of additional activity rather than that the revised models become suitable to a greater proportion of the general population of counselors.

What we most probably end up with is that no more than fifteen to twenty per cent of practicing guidance counselors would be willing to implement even a cost-feasible guidance support system. If the cost is higher the percentage would be lower.

Perhaps these figures are far off-base, and perhaps the argument itself is even further off-base, but I think not. What I think is likely to occur is that we end up by producing a finely honed guidance support system which can and will be actually used only by those counselors

attuned to this razor sharpness. If there were a greater number of these counselors around today or if I could foresee greater numbers of them in the next twenty years I would not perceive this as a problem. I do not, however, see many encouraging signs.

If one were to accept the situation as stated above is there then no resolution to the problem? I believe there could be. If we really do feel that counselors must be acceptable in order that our support systems operate effectively then we must plan for it. If we are really interested in the implementation problem then we must plan for it now.

What I have done is to formulate four propositions and followed each of them up with a discussion ot its implications for eventual implementation of guidance support system. They are not meant to be solutions but considerations involved in the implementation process.

1. Since the total guidance program in a school unit is a part of the total education system of the community which it serves each guidance program (from school unit to school unit across the country) is unique.

IMPLICATIONS. . .

Widespread counselor acceptance of a guidance support system is possible only to the degree to which the support system is directed toward the communalities between one guidance program and the next. A very broad-guaged guidance support system is limited in counselor acceptability precisely because it attempts comprehensiveness.

2. The degree of counselor acceptance of a guidance support system is inversely related to the portion of the schools' total guidance program of which the support system has been designed to include.

IMPLICATIONS. . .

The more numerous the roles and function of a counselor which the system has been designed to handle the more threatened most counselors would feel. There appears to be a continuum of alternatives available to the systems designer. The extremes of the continuum are representative of quite diverse strategies. At the one extreme the strategy calls for quite gradual introduction into the guidance program of guidance support system with limited scope. The other extreme represents the all-or-nothing strategy. Obviously implementation problems will be more acute with the latter kind of strategy than with the former. What is involved, however, as the primary consideration to choice of strategy is the determination of the best means to reach the accepted objective (if, in fact, such an objective has been formulated).

3. Schools in which counselors are least likely to accept a guidance system approach need most improvement, and conversely, schools in which counselors are most likely to accept a guidance system approach need least improvement.

IMPLICATIONS. . .

If, indeed, we wish to make the greatest impact on guidance is

there not a choice between developing approaches suitable to counselors who need the most help as opposed to developing an approach acceptable to only those counselors who are "most capable"? It appears that we are currently leaning toward this all-or-nothing approach.

4. Since the counselor's role is affected by the introduction of a guidance system approach the counselor should be aware of the function of the system in the total guidance program.

IMPLICATIONS. . .

Counselors must be involved in the planning and developmental stages in order that implementation problems be minimized. The counselor must satisfy himself both that the guidance system fits into the total guidance program and that it fits in what he perceives as a proper place.

Obviously I've offered no answers to implementation problems in this paper, merely considerations. There are as many types of counselors as there are types of schools and types of kids. There appear to be that many problems involved in implementation of systems as well. Because of this, I don't believe there will be a guidance support system developed in the next 10,000 years which will be acceptable to even a majority of counselors, and I'm both highly optimistic and highly thankful for that.

The major recommendation I would make is for counselor involvement in our efforts at all stages--planning, trial, evaluation and revision within the framework of what he sees himself best doing in his particular

school system with his particular youngsters. I think that the counselors themselves must become capable of developing their own guidance support systems to suit their own particular needs. There involvement in our efforts would provide them with an impetus to direct their own activities. I am convinced that the future of guidance will depend upon the ability of counselors to do this job for themselves, perhaps with the help of people like yourselves.

They can then proceed with implementation with no obstacles in their way. Since the problem is not solved, I'll shut up.

EXPERIMENTATION WITH

COMPUTER ASSISTED OCCUPATIONAL INFORMATION*

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1968
January, ~~[illegible]~~

*With financial support from the Pennsylvania Department of Public Instruction

1. BACKGROUND

Because of the increasing complexity of the work world in which we live it becomes essential to take a hard look at the guidance program found in our schools. The school counselor is the person whom we rely upon to help our young people understand the world of work and to help them explore their places in it. The great importance of occupational information as a means of aiding the counselor in this task has been acknowledged (Hoyt, 1964; Baer and Roeber, 1964; Hoppock, 1963).

In relying upon the counselor as the primary resource to gather, sort, validate and transmit the tons of literature covering thousands of occupations we are not being realistic. We are asking counselors to accomplish an impossible task, one that is ill suited to his nature and capabilities. But what other, more effective ways are available to do the job?

Many efforts have been made to provide pupils with occupational information utilizing more effective, more attractive, and novel methods. Kenyon (1952) has reported the results of a community effort in this area using tape recordings of occupational descriptions, requirements for entry into the occupation, and local employment opportunities. Another example of the use of tape recorders in transmitting occupational information is reported by Rundquist (1958). In this latter instance recordings were made of actual workers in occupations answering questions about their jobs.

Closed circuit television has been utilized in Washington County, Maryland in an attempt to convey occupational information to a large number (8000) junior and senior high school pupils (Beachley, 1959).

A combination of two methods of presentation, colored slides of fifty local occupations, synchronized with a taped commentary describing the duties, training, and working description of these occupations has been reported by Meagher (1955).

All of the methods described above have at least one major limitation. That is, the same occupational or career information is presented to all of the pupils involved. Thus, the pupil with low academic ability and potential, and possessing little interest in mathematics and the sciences must submit to a period of boredom when the occupations of surgeon, engineer or research chemist are being described.

The computer-based occupational information system has been designed to overcome the limitations of these various methods through selective presentation of the material to individual pupils. It is the result of the refinement and integration of two prior approaches to improve vocational guidance.

The first approach is exemplified by the novel methods of presentation described above. The value of the novel presentation of occupational information to pupils has been thoroughly acknowledged and has consequently been fully utilized in the current system. The refinement of this approach has been attained by capitalizing on the flexibility of the computer system. First, the system is designed to allow a goodly amount of pupil participation in the interactive process. Secondly, not only are colored slides and tape recordings utilized, but also a typed record of the content of the session is obtained to which the pupil may refer at any future time. The third refinement is to permit an unlimited increase in the number of occupational descriptions in computer storage.

The second approach which has contributed to the development of the system was that devised by Hull (1925). At that time Hull reported a "comprehensive system of vocational prognosis" (Hull, 1925). His system involved: (1) the categorization of all occupations into 40 vocational groups or "type aptitudes"; (2) the administration of 30-40 distinct tests which would comprise a "universal battery" to great numbers of workers; (3) the development of 40 regression equations utilizing the test measures as predictors, and success in the 40 occupations as the criteria; (4) the use of machine to solve the 40 regression equations for each individual based on his aptitude test scores--" . . . the machine will solve in immediate succession a large number of different equations each yielding a forecast for a different vocational aptitude, all equations being based upon one and the same battery of tests" (Hull, 1925); (5) the individual finally examines his predicted scores on each of the 40 occupations to determine which occupations provide both his least chance of success, and greatest chance of success; (6) "The three or four most promising vocations thus emerging may be given further investigation" (Hull, 1928); and (7) from this information the individual may choose his life's work.

Hull foresaw the difficulties involved in promoting his system in stating, "It scarcely needs to be pointed out that the program of vocational guidance thus briefly sketched is a revolutionary departure from the current development of aptitude testing. This being the case, there will no doubt be considerable inertia and resistance from conservative quarters." (Hull, 1928).

Prophetically, though, he added the following, "But the logic of the situation is certain to triumph in the end. We may look forward with confidence to a day not far distant when some such system as that sketched above will be operating in every large school system. Then, and not until then, will there be possible a genuine vocational guidance for the masses of the people" (Hull, 1928).

Hull's approach was refined in the current system by utilizing current computer advancements, and by dependence upon a less empirical approach to occupational exploration. The use of equations based on test scores to predict success in specific occupations is a desirable goal, but at present is not feasible. The data needed for developing such equations are not available--reliable criterion measures of job success, the actual relationship between scores on a variety of interest and personality dimensions and degree of job success, and the relationship between measured aptitudes and job success, for each of the occupations and their groupings.

The data that are available, and consequently have been used in the present system, are minimum scores required on each of the subtests of the General Aptitude Test Battery and other minimum worker trait requirements essential to minimal success within the occupational grouping listed in the 1965 revision of the Dictionary of Occupational Titles. Generally, the computer is programmed to compare minimal aptitude requirements for the occupational grouping (intelligence, verbal, numerical, spatial, form, clerical, motor coordination, finger dexterity and manual dexterity) with an individual's scores on these subtests. The "G" aptitude or intelligence as measured on the GATB

is compared first, and descriptions of occupational groupings which require the greatest degree of that specific aptitude for which the individual qualifies are presented.

Over thirty years ago Bingham proposed the importance of the information function of the counselor.

> It is not a function of counseling to decide for what calling a youth shall prepare. That is his own responsibility and his right. It is the counselor's responsibility to place at the young man's disposal the best information available, including the most reliable estimates of future opportunities it is possible to assemble (Bingham, 1934).

Three decades later Hoyt has reiterated the same theme.

> It seems to me that the time is here for a rededication to the information function in guidance. Because information has been shown as not <u>sufficient</u> for meeting the counseling and guidance needs of students does not mean that it is not <u>necessary.</u> Because students in high school today are apt to change occupations more than once in their adult life does not mean that there is no need for them to make some specific occupational plans now. Because it takes a great deal of counselor time to keep up to date on occupational and educational information does not mean this function should be abandoned nor greatly neglected.
>
> . . . Because providing information to students is not exciting does not mean it is not a worthy counselor function. If service to students is to take precedence over satisfac-

tion of status as a counselor need, then this re-emphasis must take place. (Hoyt, 1964).

In accepting the necessity and importance of occupational information, and looking ahead a bit to a time when such information can be effectively stored and utilized, Baer and Roeber have commented:

> Computer technology may have a significant impact on counseling and placement. With the aid of computers, counselors and personnel workers will be able to interpret great quantities of data concerning an individual's aptitudes and interests and other aspects of his background in relation to a wide range of occupational possibilities. Such computers will not take the place of the counselor's judgment in guidance and placement. They will digest, analyze, and array information upon which a proper judgment can be based. (Baer and Roeber, (1964).

2. Description of the System

The essential objective of this occupational exploration system is to allow youngsters to broaden knowledge about the world of work and be able to identify appropriate opportunities for them in it. The equipment that is currently being utilized is an IBM 1410 computer tied by telephone line to an IBM 1050 student terminal. The terminal itself which is meant to accommodate only one student at a time includes a typewriter-like device, a tape recorder and a slide projector, all under computer control. The computer communicates to the student by either typing out meaningful messages through the typewriter, display-

ing a particular image via the slide projector or by playing a previously recorded taped message on the tape recorder. The student communicates to the computer by typing a short pre-coded response on the typewriter. The short student response was deemed to be a necessary feature of this system since longer responses would require at least minimal typing skill. It was anticipated that a significant proportion of the students to use the system would not possess even a minimal typing skill, and thus the flow of communications between the computer and the student would be interrupted.

Information stored in the computer is of four types: 1) the computer program itself which controls the sequence of operations; 2) information about various occupations abstracted from a number of government and commercial publications; 3) a General Aptitude Test Battery (GATB) profile and a preference profile for each student who is to use the system; and 4) a GATB profile and preference profile characterizing each of the occupations for which information has been stored.

The taped messages are approximately two minute interviews with workers in each of the selected occupations. These two minute segments were edited from an original taped interview of from 15 to 30 minutes in length. The worker was encouraged to comment on his duties on the job, how he perceived the differences between his work and the work of others who although employed in the same occupation, worked for different employers; and other personal reactions to the work. The purpose of the tapes is to transmit to students the personal reaction of persons in the real world to their work, something that cannot be extracted

from reading a three page occupational description.

The slides displayed to the students (four in each of the selected occupations) picture the worker in his work environment, and focus on him performing typical tasks in his occupation. The purpose of the slides, similar to that of the tapes, is to enable students to see beyond the impersonal characteristics of occupations by attaching a face and a voice to the job.

In order to help the reader better understand the system and its use the sequence of operations which actually occurs is included at this point. The possible options open to the student at each step will be mentioned. The following abbreviations will be used: ST, student types response; CT, computer types response; CS, computer displays slide; CR, computer plays recording; and CI, internal computer operation conducted. Prior to the student's first session at the computer terminal the guidance counselor or an aide must enter the student's GATB scores into the computer storage and obtain a student number for him, the computer program including the occupational descriptions and the occupational profile data must be loaded in the computer, and the proper slide tray and recording tape reel must be loaded at the terminal. The student is given a list of occupations with corresponding code numbers. The system is ready at this point to interact with the student.

CT - Enter your student number.

ST - 1492

CI - Computer searches records for student 1492 to determine if this is his first session or not. If it is the first then

it will type out a brief explanation of the purpose and nature of computer-assisted occupational exploration. If it is not the first session the computer will search for the place where the student left off during the previous session, and return to that point. For this example, assume that this is the first session.

CT - Explanation of the system . . .

CT - Look at the slide being shown and answer the question.

CS - What are your current educational plans?
  a. Go on to a 4 year college after graduation from high school.
  b. Go on to a 2 year college following high school graduation.
  c. Enter a specialized vocational or technical program after graduating from high school
  d. Graduate from high school.
  e. Am not planning to graduate from high school.

ST - b

CI - Computer stores this piece of information about student 1492 and includes it as part of his profile.

(At this point in the sequence CS, ST, CI, is repeated for four additional preference questions, and the student's choice is included as part of his profile. These questions pertain to preferences for working indoors or outdoors, with people or relatively alone, under supervision or supervise own work, and involvement desired with physical activity.)

CT - Look at the list of occupations which has been given you by your counselor. Is there any occupation on the list which interests you at this point? If so, type the code number for the occupation. If not, type NO.

ST - 35

CT - TOOL DESIGNER

The tool designer . . . (The computer types out a one or two statement message at this point describing the work of a tool designer.)

Do you wish to find out more about the tool designer? If so, type a. If you wish to go on to some other occupation, type b.

ST - a

CS - The computer activates the slide projector to search for the tool designer slide. This is accomplished by a preset indexing system. The slide for the tool designer is displayed.

CR - While the slide is being displayed, the interview with the tool designer is played. The computer activates the tape recorded to search for and play the tool designer segment in a similar manner as for the slides.

CI - When the interview is complete the slide is removed as well. At this point the computer compares the profile of student 1492 with the profile stored for tool designer and notes discrepancies.

CT - The tool designer works primarily indoors.

The work of a tool designer involves only an average amount of physical activity.

(All discrepancies between the student profile and the occupational profile are listed here.)

CT - The computer goes on to type out the remaining information concerning tool design which has been stored. This includes information about salary, working conditions, opportunities for advancement, educational and training requirements for entry and future outlook.

(The entire segment for any of the occupations takes from six to eight minutes to complete from beginning to end.)

(The same process is repeated for each occupation a student selects. At the point when a student chooses not to select another occupation the following sequence results.

ST - No

CT - Would you like the computer to select occupations for you which you may wish to consider?

ST - Yes

CI - The computer compares student 1492's profile with each of the occupational profiles in storage and lists those which favorably compare.

CT - Draftsman
Tool Designer
Electronics Technician
Electrician

CT - Are there any of the occupations listed which might interest you?

If so, type its code number. If not, type NO.

(The process then proceeds as before.)

The system as it currently is operating includes descriptions of eighty occupations most of which are trades or technical occupations, and none of which require more than three years of education beyond high school. The type of student for whom the system was originally designed are ninth grade boys enrolled in a system where a choice of senior high school course of study must be made at ninth grade. The current system, including only eighty occupations is meant to be a prototype of an expanded future system. The rationale involved in developing the smaller scale system was that the technique needed to be tried out before a large scale effort could be justified. Thus the development of the initial system was completed in January, 1967, and was field tested in the spring of 1967 at Keith Junior High School in Altoona, Pennsylvania.

3. The Field Trial

In March 1967, 115 of the 200 ninth grade boys attending Keith Junior High School had indicated a preference for a vocational or technical program at the senior high school the following year. This group of 115 boys made up the total group from which a random sample of 75 students were selected to participate in the field trial. The reason for reducing the size of the field trial sample from 115 to 75 was the limitation of time remaining in the school year. Only eight weeks remained from the beginning of the field trial to the conclusion of the school year, and in order to obtain adequate feedback

from the students as to their reactions to the system it was anticipated that 75 boys could be handled at most.

Immediately following his selection each of the students were administered the GATB which was released by the United States Employment Service (USES) to the project staff for research purposes. From the results of the testing it was possible to establish for each student an aptitude profile. The profile, derived from ninth grade norm data reported by the USES consisted of a score range on each of nine aptitudes - General (G), Verbal (V), Numerical (N), Spatial (S), Form Perception (P), Clerical Perception (Q), Motor Coordination (K), Finger Dexterity (F), and Manual Dexterity (M).

Between April and June, 1967 each of 69 students spent at least three forty minute sessions and as many as five forty minute sessions at the terminal. Scheduling of additional sessions was prohibited by the termination of the school year. A guidance counselor working on the project as a graduate assistant served as proctor during each of the sessions.

4. Results of the Field Trial

At the conclusion of each student's final session with the terminal the project's guidance counselor interviewed him to determine his feelings about the experience to which he was exposed. The following observations were made by the counselor after an analysis of the playbacks of the taped interviews.

a. When students in effect asked the computer to select occupations for them which they might be interested in exploring many times the computer typed nothing out. The students were

confused by the implication of this occurrence.

b. There was a tendency for the higher ability students to change rapidly from occupation to occupation, not utilizing the option to obtain the more expansive description.

c. In many cases students indicated that the slides and tapes were staged rather than being realistic.

d. In general, the students felt that the computer typeout sheets which they were allowed to keep served as an important source for future reference.

e. An important feature of the system was felt by the students to be its objectivity and the confidential nature of the exchange.

f. Students placed a great deal of trust in the authority of the information communicated by the computer. "The machine gives straight answers," and "I'm sure of the facts I learned from it," are typical reactions of the students.

In addition to the interview data a paper and pencil reaction inventory was administered to the 69 students who participated in the trial. Student reactions were grouped into those related to the equipment itself, those to the information which was presented, and those which related to the procedures utilized in the system.

Generally the students agreed that working at the computer terminal was an interesting, helpful and simple means of exploring occupations. They also generally felt that the occupational descriptions were neither too long nor too brief, that they were easy to understand, that they would probably be of great use to them in the future, and that they stimulated them to explore occupations on their own in other occupations.

Summing up their reactions to each of the phases of the system it can be said that their feelings were highly favorable. The typeouts were considered to be the most helpful output of the system, the slides and tapes being felt to contribute little to the students' understanding. This highly favorable reaction must be interpreted in the

light of the magic and glamour attached naturally to computers by highly impressionable youngsters of ages 13 and 14. Although many of the students had been exposed to remote input stations at Keith Junior High School connected to a central computer at Altoona Senior High School, they had no previous opportunity to communicate in natural language with a computer. There is no question that a halo effect was operating in the field trial situation at Keith.

5. Current and Future Activities with the System

Based on the findings of the initial field trail of the Computer-Assisted Occupational Exploration System at Keith several changes were built into the system during the summer of 1967. These changes focused on the potential of the system to expand rather than narrow down a student's vocational horizon. Although expansion of this horizon was the stated purpose of the system operating at Keith it was found that this expansion was not achieved.

The revised system is currently being field tested at Roosevelt Junior High School in Altoons. The field trial began in October and will continue through April, 1968. The sample of students at Roosevelt include 147 ninth grade boys who have indicated they may be interested in selecting a vocational or technical program at the senior high the following year, but who have not made a final choice. Each of the boys in the second field trial have been allowed to spend as many sessions with the terminal as they feel are desirable. The number of 40 minute sessions a student chooses' to spend with the terminal has ranged from 5 to 8 in the second trial.

On the basis of the evaluation of the current system at the completion of the trial at Roosevelt recommendations will be made by the

project staff with respect to the future of this approach. If a strongly positive recommendation is made there will exist substantial support for the expansion and continued revision and trial of the system. Only in the expanded system, including descriptions of hundreds of occupations will the capacity, flexibility and speed of the computer be absolutely necessary and aiding youngsters in their exploration of the complex world of work.

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THE COMPUTER AS AN AID TO INSTRUCTION AND GUIDANCE IN THE SCHOOL

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This paper focuses on five areas within the general field of computer applications in education:

1. A general description of computer-assisted instruction (CAI), and computer-assisted guidance and counseling.
2. A discussion of the number and types of computer-assisted developments currently underway across the nation.
3. The nature of the program at Penn State University.
4. Tentative results of experimentation and field trials using CAI and other computer applications.
5. Some implications and projections for the future.

On the copy of this paper which is available to you if you wish a copy I have underlined "assisted' when I mentioned computer-assisted instruction and guidance previously. The reason for emphasizing these systems as essentially supportive and supplemental to the teacher or counselor in the educational process is that it is this particular feature which is disregarded by most critics. The major attacks on computer-assisted instruction and guidance focus upon the non-humanistic nature of these systems. I contend that these systems may well become the most humanizing element ever introduced into American education. I will amplify this notion in the last section of this report.

Before embarking upon a description of computer-assisted instruction and guidance I believe it is necessary for us to keep in mind their twofold objectives. Their first objective is that of providing an effective instructional or guidance tool. The

second objective is that of developing an effective research vehicle. Of primary interest to most universities is the latter objective, while our schools, state departments of education and various profit-making institutions are focusing on the former objective.

Currently an unusual state of affairs exist -- there appears to be some balance of efforts in the two directions. There are already indications, however, that in the near future this situation will be altered considerably. You know better than I which way the scales are bound to tip.

General Description of Computer-Assisted Instruction and Guidance

CAI is an individualized method of instruction whereby a computer by means of some student-subject matter interface equipment elicits student responses to questions it presents, processes those responses, and based upon some decisions model proceeds to other materials in the programmed sequence. To get a better idea of the nature of CAI let's discuss this rather lengthy description in parts.

First, it is individualized. That is, a student allowed to progress at his own rate. In addition based on a students' history of responses (did he answer the last question correctly--the last two--at least three of the last five?) the student is led through a programmatic sequence which should result in the greatest amount of student learning. The extent of individualiza-

tion in any program is dependent upon the author of the program, the computer language he is using and the variety of interface devices available.

Second, CAI is a method of instruction. It is a way of teaching some specified content to some specified group in order that certain specified learning objectives are met. Our predominant orientation to categorizing subject matter by courses rather than by learning objectives may well interfere with our comprehension of this aspect of CAI. A CAI program in modern mathematics may not fit into any of our defined notions about a course for college freshmen, or one for high school juniors. It is rather defined by a specific set of objectives. The objectives of the program should be largely dependent upon a broader set of objectives developed by a teacher or group of teachers in a specified subject matter area. Primary consideration must be given in allocating objectives to the CAI program which of the objectives can be most appropriately handled by the computer.

Third, in order to operate,the computer in the CAI system must be connected to some device so that the student will be able to interact with the program. These devices are known as the student-subject matter interface. They are exemplified by the two-way typewriter, cathode ray tube, slide projector and tape recorder. They provide the input and output whereby the communication between the student and the subject matter take place.

Fourth, most CAI programs proceed in such a manner that a student is forced to answer each question posed or he won't be able to go on. In fact, he must produce the right answer (eventually it is usually presented to him). The overt act of constructing the correct response to an inquiry has in many cases proven to be an asset to learning.

Fifth, an essential feature of CAI programs is immediate feedback. That is, when a student responds correctly to an inquiry it is indicated that he is right. If the student answers correctly he may be asked to reconsider his answer, told he is wrong and to try again, or provided with the right answer and asked to supply it.

Finally, CAI programs are usually constructed to progress on the basis of some decisions model. If a student misses two consecutive questions in a certain segment of the programmed material he may be branched to a series of remedial frames. The decisions model, programmed by the course author spells out the criteria for such activities as branching to remedial segments of the program, moving on to more complex materials, or branching to final test items.

There are probably as many hardware configurations currently in use as there are CAI installations. The essential elements in all of them, however, are a number of remote student terminals connected to at least a medium-size computer in which are stored instructional programs. The distance between the remote

terminals and the central computer varies between the various installations around the country. Until recently Florida State University operated terminals which were connected to the IBM Watson Lab located at Yorktown Heights, New York. At Stanford University, because of the use of the cathode ray tube interface the distance between the terminals and the computer can be no greater than 1,000 feet.

CAI has preceded efforts in guidance and counseling by at least three years. In fact,computer-assisted guidance and counseling hasn't even adopted a mnemonic. There are currently only two operating computer-assisted guidance and counseling systems in existence in the country. Much of what has been said about CAI including hardware configurations, the twofold objectives of research and development of an effective tool, and an individualized approach can be repeated for computer-assisted guidance and counseling.

Extent of Current Efforts

Recently Donald Reynolds, Director of the Instructional Systems Institute of Texas Christian Institute conducted a survey to determine the extent of CAI involvement of colleges, universities, school districts, profit-making institutions and non-profit-making institutions(7). As of July, 1967, Reynold's survey revealed that 26 CAI systems were operating. It was also found that 29 additional systems were on order and would

probably be operating by June, 1968. On the basis of this data and other recent reports by Entelek Incorporated (3,7) and in the September, 1967 Educom Bulletin (1) I would say that conservatively there are today no fewer than 35 CAI systems currently operating.

According to Reynolds, as of July, 1967, there were 124 full-time professional staff working on CAI installations, 152 part-time professional staff, 341 full-time computer programmers, 233 part-time programmers, 109 graduate students, 445 full-time sub-professionals and 233 part-time sub-professionals. When totalled, the figures for number of personnel involved in CAI activities runs to over 1600. Within a year of the date of the survey it is expected that the number of staff will increase by over 120 per cent. As of July, 1968 then the figure should reach approximately 3,500.

Of the 55 CAI installations currently operating or being planned Reynolds reports that 18 indicated that basic research was their primary goal, 23 indicated that their primary concern was applied research, and 12 stated that their major emphasis was in curriculum development. The college student population was, as may be expected, the group to whom an over-whelming majority of the efforts were directed. The primary level population and the secondary level population were about equal in number of applications. Other special applications of CAI were reported

in teacher training, other professional training, special education and business and industrial tiaining.

In the most recent issue of Educom (1) there are reported several CAI activities currently underway at the U.S. Naval Academy, Florida State University, University of Oklahoma Medical Center, Carnegie Tech, Wayne State University, and the State University of New York at Stony Brook. CAI News (7) reports CAI activities at Seton Hall University, Columbia University and the State Education Department of New York in a contractual agreement with Systems Development Corporation.

To give you an idea of the diversity of these efforts a brief description of the efforts mentioned is presented below.

U.S. Naval Academy - a configuration of twelve IBM 1500 terminals connected to an IBM 1800 computer -- provision for multi-media capability including closed circuit TV, image projection, tape recordings and programmed texts.

University of Oklahoma Medical Center - teach public health.

Carnegie Tech - industrial administration.

Wayne State University - psychiatry.

Florida State University - CAI covers a whole instructional spectrum -- from science for elementary school children and physics for non-science majors to a graduate course in social welfare. High school dropouts are coached in basic reading and math in an adult literacy project.

SUNY at Stony Brook - programs available in French, German, and statistics.

Seton Hall University - CAI program being developed to teach Chinese to prospective teachers of Chinese.

Columbia University - expects to be operating nearly 200 teletypewriters and cathode ray tube terminals on its campus by mid-1969.

State Education Department of New York - high school biology teachers in Albany were trained during the summer in the use of CAI teachniques. SDC, under contract with them, is exploring the feasibility of developing four CAI biology lessons.

Another important aspect to consider in examining the growth of CAI activities may be seen in a recent decision by the Office of Education. The USOE has awarded two contracts, one to IBM Corporation and the other to General Learning Corporation (7). The purpose of both contracts is to define the optimum design for a CAI system with 100,000 terminals located within a radius of one hundred miles. The parameters include:

a. terminals to be located within 50 buildings for youngsters in grades 9-11.

b. problem solving capabilities

c. use in data-processing training

d. administrative functions

e. cost of instruction not to exceed \$.40 per student hour.

In awarding these contracts the Office of Education has apparently projected the continued vast growth of CAI.

There are several computer-assisted developments underway at this time which could prove to be of great use to the guidance counselor in complementing his current activities. Those I will mention are vocational guidance aids rather than educational or personal guidance aids. Two closely related reasons why the area of vocational guidance is currently attracting the attention of researchers are: (1) the problems are more acute than in the other areas -- the typical academic counselor bound by middle class values and unwilling to cope with problems of career development -- the changing nature of the world of work with its increasing demand for technological knowledge on the worker; and (2) the stimulation of research funding from the 1963 Vocational Education Act.

David Tiedeman and his associates at Harvard are developing an Information System for Vocational Decisions (ISVD) in cooperation with the Newton, Mass. school system and the New England Educational Data System (Needs). When operational as a prototype system (projected July, 1969) it will make use of student and worker characteristics, facts about occupations, education, military service and family. These facts will be placed in computer storage and anyone from a third grader to a 60 year old bricklayer out of a job will be able to make inquiries of the computer through some type of console device, test out tentative decisions on it, and obtain feedback from it.

Frank Minor at IBM working with Donald Super and Roger Myers

of Columbia are developing a computer-assisted vocational guidance program utilizing similar equipment as the Penn State operation (IBM 1050 terminal connected with an IBM 1400 series computer). The approach they have taken is to proceed with a twelfth grade youngster from his knowledge of various aspects of the world of work, exploration of the concepts of field of work and level of work, and then eventually to discussions of specific occupations within certain fields and levels.

William Cooley, formerly of the American Institutes for Research and now at the University of Pittsburgh has developed a computerized scheme whereby youngsters (ninth through twelfth graders) can obtain actual probabilities of their chances of success in any one of six major fields of work. These data have been developed on the basis of the Project Talent results.

Computer-Assisted Instruction and Guidance Efforts at The Pennsylvania State University

CAI. Currently in operation at Penn State is a hardware configuration of eight IBM 1050 terminals (four of which are located at University Park and four in field locations) tied to an IBM 1410 computer located at University Park by means of telephone lines. Three major activities are being conducted: curriculum development research, computer systems development and research and learning research.

Curriculum development research is being conducted in the areas

of: communication skills, mathematics and physics for technicians; instrumental music (teaching of the clarinet); audiometry; sixth grade spelling; and the identification of malaria parasites. Recently completed at Penn State was a CAI project conducted by Mitzel (5) in developing and presenting four college courses by computer teleprocessing. The college courses were: modern mathematics, speech pathology and audiology, cost accounting and engineering economics. Results of the field trials of these courses will be discussed in a later section of this report.

Attacks on problems in learning research recently reported by the CAI staff at Penn State include:

1. Gradient- and Full-Response Feedback in Computer-Assisted Instruction (6).
2. Relative Effectiveness of Various Modes of Stimulus Presentation through Computer-Assisted Instruction (6).
3. Remedial and Review Branching in Computer-Assisted Instruction (6).
4. Expressed Student Attitudes Under Several Conditions of Automated Programed Instruction (6).
5. Feedback, Prompting and Overt Correction Procedures in Nonbranching Computer-Assisted Instruction. (6-Bib.)

COAG. The first phase of the computer-assisted occupational guidance program in the Department of Vocational Education at Penn State is currently being field-tested. The purpose of this initial phase is to develop and evaluate a system of presenting

occupational information to ninth grade pupils, utilizing the computer-assisted instruction facility currently available. This system will provide a model for a more extensive, extremely flexible, easily updated information-giving system.

One of the most unique features of this system is that of selective presentation of occupational information. The selection of the materials to be presented to the individual student is based on that student's General Aptitude Test Battery (GATB) profile which is stored in the computer memory. Another of its unique features is the manner of presentation of the materials. Not only are materials typed out at the console where the student is to be seated, but also is presented on sound recordings and slide projections, all integrated under computer control.

This system is visualized not as a substitute for the counselor, but as an effective complement to the counselor. It provides the function of information-giving, that portion of the vocational guidance process which counselors are admittedly less adept to handle, and more willing to delegate.

The computerized occupational information system may be thought of as a powerful tool of the school counselor in the vocational guidance process. The school counselor must become actively involved if this "tool" is to be effective. Outside of the vocational guidance process the system has little utility. The system thus will function effectively only in a school where the guidance counselor acknowledges the value of vocational guidance

for ninth grade pupils and recognizes the need for them to acquire knowledge about occupations.

The unique advantages of the computerized occupational information system are its flexibility and its storage capacity. Its flexibility allows for unnumerable changes in the existing system -- changes in certain aspects of existing job descriptions such as educational requirements, employment outlooks, or work hours per week; the addition of new job descriptions; or the deletion of certain jobs which are being phased out of existence.

The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable characteristic student profiles. Any changes that occur in jobs and employment opportunities as well as up-dated student information can be immediately entered into computer storage.

In what ways will the computer-based occupational information system more adequately meet the needs of ninth grade pupils? First, since the interaction is with the student, independent of counselor involvement, all students will be offered the opportunity to obtain occupational information, not only those selected students for whom the counselor has time available. Second, the occupational information that is presented to the students will be accurate and up-to-date, resulting in the more realistic transmission of opportunities in the world of work. Third, the manner of presentation of the occupational materials via typewriter, tape recordings, and slide projections will

instill greater pupil interest, and consequently greater pupil growth in knowledge of the world of work. Finally, the selective nature of presentation of the occupational information will result in pupil acquisition of a more adequate picture of himself in relation to the world of work.

Through the development of the system including only a limited number of occupational groupings and specific vocational trade and industrial job descriptions to be presented to ninth grade pupils, it is expected to establish a prototype for a more comprehensive system in the future. Each pupil using the system is allowed to cover as many specific occupations as he has the time and the inclunation. Each grouping and specific job he does review, however, will be presented in relation to his own aptitudes and interests. The materials presented is thus pertinent, meaningful occupational information.

The result that is expected is the more realistic, intelligent choice of a vocational goal to give some meaning and direction to the rigorous training and/or rigorous educational pursuits involved in attaining such a goal

In the spring of 1967 we tried out a tentative program at Kieth Junior High School in Altoona, Pennsylvania with about 75 ninth grade boys who were selected because they had indicated some interest in a vocational or technical training curriculum at the senior high. The program included descriptions (including slides and recorded interviews with workers) of 40 occupations.

The reactions we received from this group of boys was quite interesting. They felt that the information they received was quite helpful to them. They told us not to get too excited about the slides and tapes we presented -- it was the typeout that they felt was more interesting and important to them. They felt that the length of each session they had at the terminal was much too short (40 minutes). They indicated a preference for one to one and one/half hour sessions at the terminal. We are currently trying out another version of this program with a group of 150 ninth grade boys at Roosevelt Junior High School in Altoona. We also are developing a program which includes a more representative sampling of occupations divided into occupational categories.

Hopefully within the next five years we will not only have developed an operational guidance tool but will also be able to provide evidence related to its effectiveness and applicability at the various stages of career development.

The second phase of our computer-assisted occupational guidance effort is to develop sequential programs for seventh, eighth, and ninth grade boys and girls. Each program will be an outgrowth of the previous programs, proceeding from the general to the specific.

Constant feedback has been palnned for our field trials in the form of student reactions, counselor reactions, changes in student attitudes and values, and eventual performance of students

in their senior high school program.

Results of Research

Computer-assisted guidance efforts are still primarily in the developmental stages. It is thus apparent that little research data exists. The data from our spring pilot project in Altoona appears to be, in fact, the only such data available. That data does at least indicate that our efforts are perceived as beneficial, and the CAOG program experience does result in changes in students' occupational attitudes and values.

In searching through the literature I did locate an interesting piece of research conducted by Gilbert and Ewing at the University of Illinois (2). It has some definite implications for our work in computer-assisted guidance. One of the stated objectives of the study was "to discover whether the personal relationship factor present in normal face-to-face counseling situations and absent, to a very high degree, in a counseling book is an important variable." It was stated in the summary of the report that,

> While it cannot be concluded that the personal relationship factor is totally unimportant, it can be concluded that the personal relationship factor has been overemphasized in teaching, counseling, and probably psychotherapy. Consequently, teaching machine procedures are feasible in these situations where the personal relation-

ship factor has been considered necessary.

Part of the Penn State study to develop four college CAI courses (5) involved field trials. Data is presented in the final report on the speech pathology and audiology course segment and the engineering economics course segment. Each of the two field trials was conducted in the same manner. Twenty-one students were randomly assigned to one of three treatment groups -- the CAI method and the lecture method or the self-study method. No significant differences in learning nor retention was found in either trial between the methods. With only seven students within a treatment group the results reported are not surprising.

Generally favorable student reactions to CAI were reported in the study (5). Slightly negative reactions of students to CAI were expressed in terms of its inflexibility, the lack of opportunity for discussion and its tension arousing tendency.

It was also reported in the study that students with poorer Scholastic Aptitude Test (SAT) scores performed more poorly than those students with higher SAT scores, and displayed more of a negative attitude toward the method . From correlational data which was computed it appears to be likely that the poorer attitude of the low SAT students was the result of their poor performance rather than the result of their lower ability.

Strum and Ward (10) attempted to evaluate over a six month period the potentialities of CAI in the environment of engineer-

ing education. The authors concluded that "CAI has little to offer in the environment of the engineering classroom that is both real and superior to parallel techniques."

The Role of Computer-Assisted Instruction and Guidance in the Future

The current role of computer-assisted instruction and guidance is that of an experimental tool. It is useful to the researcher who is interested in exploring strategies of instruction and learning. This would still be its primary role even if the tremendous problems of cost, author time involved, and shortcomings in its capability to communicate meaningfully with the student were overcome. The fact is we do not know enough about the computer as an aid or an obstacle to learning. There is currently little evidence available to indicate the effectiveness of the CAI approach with X kind of student learning subject matter Y in situation Z . Perhaps we will be in a better position to evaluate the many CAI efforts currently underway across the country.

As mentioned in the introductory comments in this paper I believe that CAI has the potential to contribute to humanizing rather than dehumanizing education. It theoretically can provide a means to move pupil-teacher interchanges past information exchange. Students who come to the teacher already equipped with the pertinent information can more readily deal with complex concepts and relationships between them. The role of the teacher is then revised. He becomes more of a catalyst or sounding board

than an information giver. Freed from the drudgery of routine repetition teachers may be able to become true stimulators of ideas.

One last comment about the future of computer-assisted instruction and guidance. I visualize both of these applications as fitting into a total instruction program or guidance program respectively. Those functions of instruction and guidance which these systems will have been found can handle most effectively will be delegated to them. In accomplishing these ends, then, the teacher, counselor, and curriculum director must actively participate. In order for them to become involved, however, they must be trained in the capabilities of the available techniques and their mode of operation. A new breed of teachers must emerge from our teacher education institutions -- a breed that can deal effectively with the complex problems inherent in such a process.

Though I feel very strongly that the future of these computerized methods is in their value as aids to instruction and guidance rather than as independent entities, I feel just as strongly that there will be a place for them in the future of education. The notion that the one to one ratio of student to teacher or student to counselor is the ideal goal is not acceptable to me. I believe there are some major functions which can only be handled by computer-assisted devices whether a teacher or counselor is responsible for one student or one hundred students.

Whether I am proven right or wrong about these projections is relatively unimportant to me. What is important to me is that others are stimulated to fight as hard as I for an opportunity to find out.

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A DESCRIPTION OF A PROGRAM FOR COMPUTER-ASSISTED OCCUPATIONAL GUIDANCE DEVELOPED AT THE PENNSYLVANIA STATE UNIVERSITY

by
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October 28, 1967

The creation of a program for the dissemination of occupational information for guidance purposes requires that several parameters be established before a program is written.

These are:

1. The purpose and methods of presentation defined.
2. The limitations of hardware.
3. The limitations of the programming language.

Since the philosophic foundation of the research project is covered elsewhere, this description will not cover this area except to point out that the program is written to be non-directive in nature.

The current terminal hardware prevents the development of mass random access for the audio and visual portions of this program. Future hardware will probably allow an expansion over the present possibilities of eighty slides and about ninety minutes of tape. The program is written in a language developed by IBM for instructional purposes called Coursewriter. This language is somewhat restricted for logical manipulations such as sorting or comparing. This limitation has been overcome as much as possible by use of conditional branches in a comparison matrix using switch settings.* The on or off settings of the switches represent bits of data.

DESCRIPTION OF THE PROGRAM

The program begins with a zeroing routine for several blocks of switches. These switches are used for the storing of the student's aptitude scores from the GATB and for the student's preferences. The aptitude scores are converted to categories (levels) from their numeric

*The switches described refer to a feature of the Coursewriter language. These are electrical representations and should not be confused with a mechanically operated on-off switch.

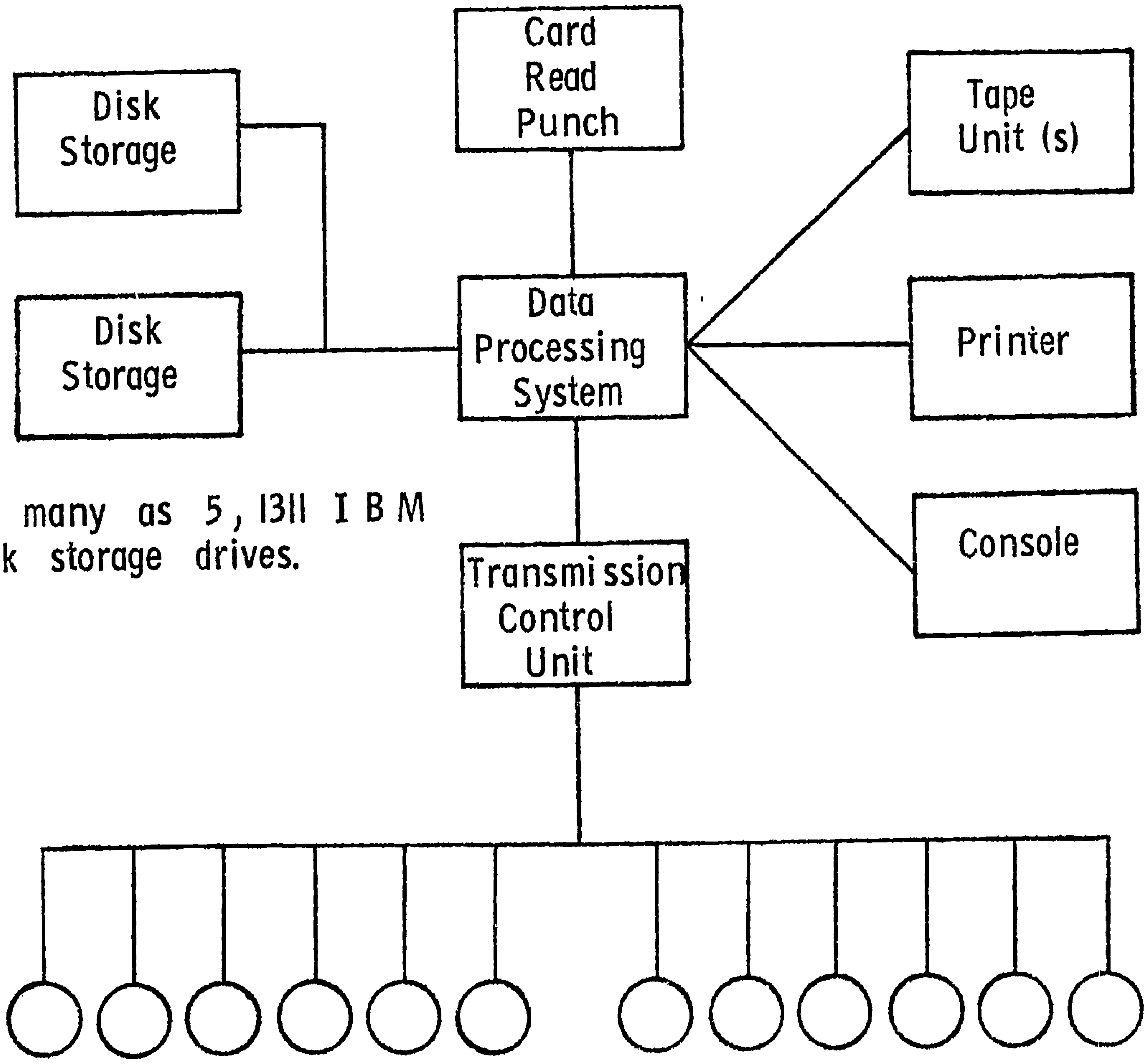
equivalents. These are entered through a terminal to the computer by a counselor or a clerical person. In the process of entering an aptitude score, a switch is set to store the level that the student has for that particular aptitude. When all nine scores have been entered the counselor or clerical person signs off the program. A number is assigned to the student at this time. The student, when first using the system, receives an introductory sequence of material. This material orients the student to the system and will not be repeated in the future use of the occupational information program by that student.

The student now has several questions presented by a visual display and these are summarized by the typewriter as are the students responses to the questions. The questions relate to the students preferences, such as whether indoor or outdoor work is preferred, what future educational attainment is planned, physical effort, etc. These responses are stored by means of switch settings. The student is now asked what occupation is desired for examination. A chance is also provided to change the answer given for the preference questions or to have the computer suggest a list of occupations based on the students aptitudes and preferences. A summary description of the occupation is provided by the typewriter when the students elects to examine that occupation. After this the student can ask for a detailed description, go to another occupation or go back to change his answers to the preference questions.

If the detailed description is asked for, the program provides a comparison routine which points out discrepancies between the student's responses to the preference questions and the conditions that usually exist

for that occupation. The computer causes comments to be typed only for the items where a difference does exist. These comments are advisory (non-directive) in nature to remind the student to be aware of the differences. At this point a visual display of a worker in several typical jobs of that occupation is shown. A recorded interview, condensed to two minutes, with this typical worker is played. This provides a closer contact to the worker than would otherwise be possible with written material alone. The recorded tape segment is accessed, selected and played by computer control. After a tape segment has been played, the typing of information resumes. The remainder of information which pertains to that occupation is then typed out. When the typing is finished, the student is returned to the point where another occupation can be chosen, the preference questions can be reanswered or the computer can be asked to suggest a list of possible occupations suited to the student. Variations of this can be continually run until the student receives all the information desired about various occupations.

A TYPICAL C A I SYSTEM CONFIGURATION

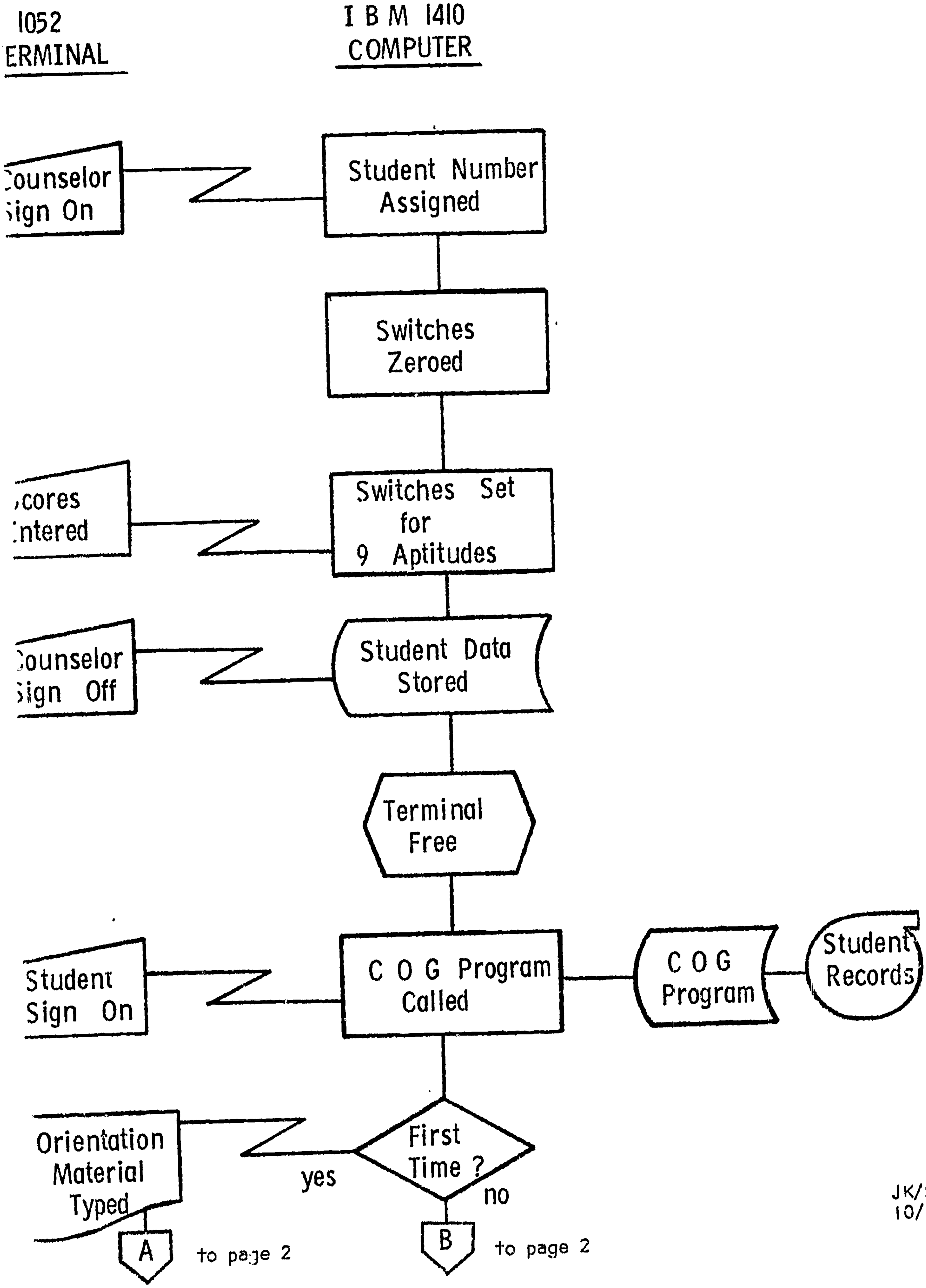


As many as 5, 1311 I B M disk storage drives.

As many as 12, 1050 terminals for students and instructors.

Prepared by Jerome T. Kapes for S. Kostenbauder.

JK/SK
10/13/67



1052
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I B M 1410
COMPUTER
Counselor Sign On
Student Number Assigned
Switches Zeroed
Scores Entered
Switches Set for 9 Aptitudes
Counselor Sign Off
Student Data Stored
Terminal Free
Student Sign On
C O G Program Called
C O G Program
Student Records
Orientation Material Typed
First Time ?
yes
no
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to page 2
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JK/SK
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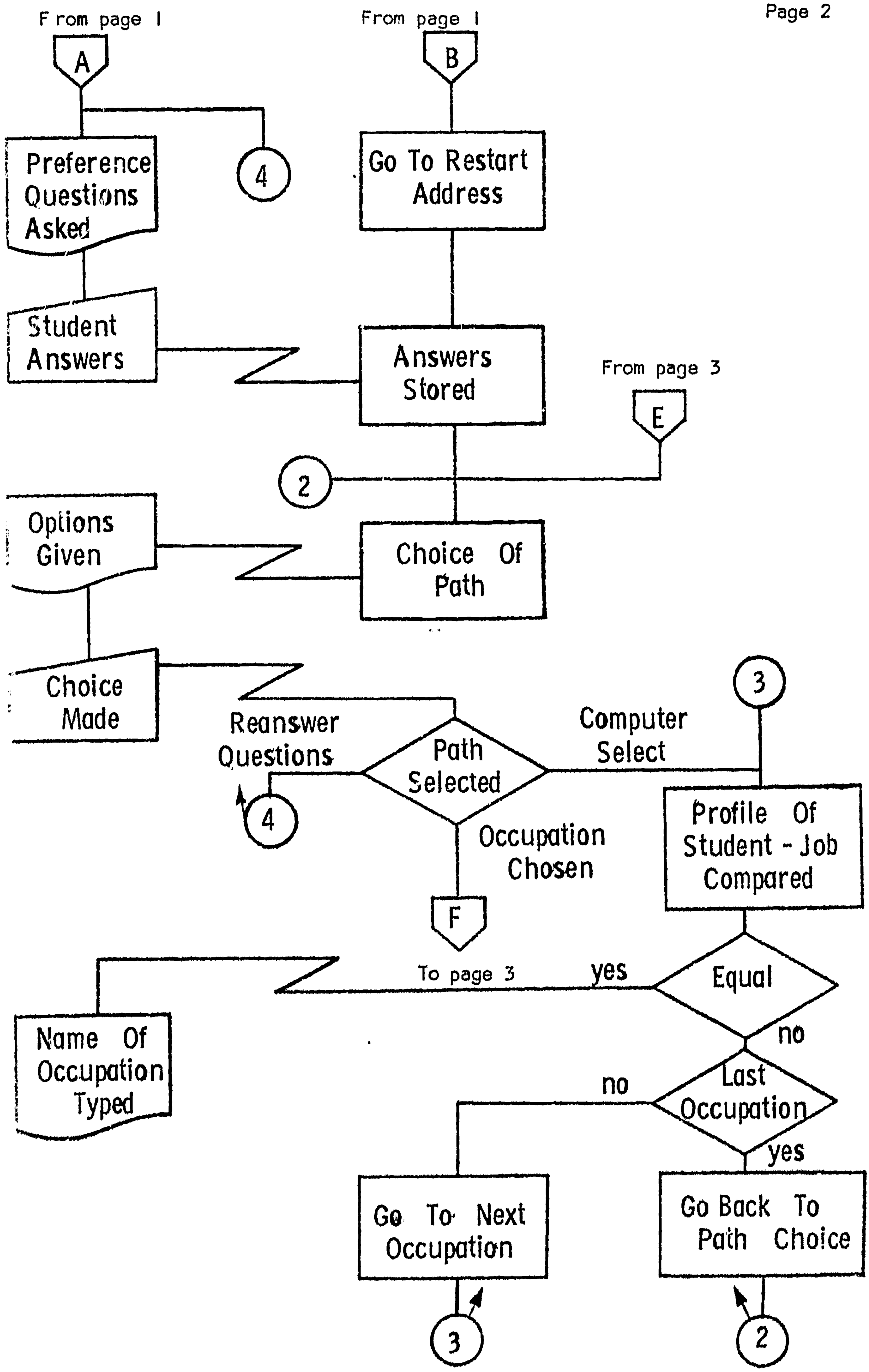
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JK/SK
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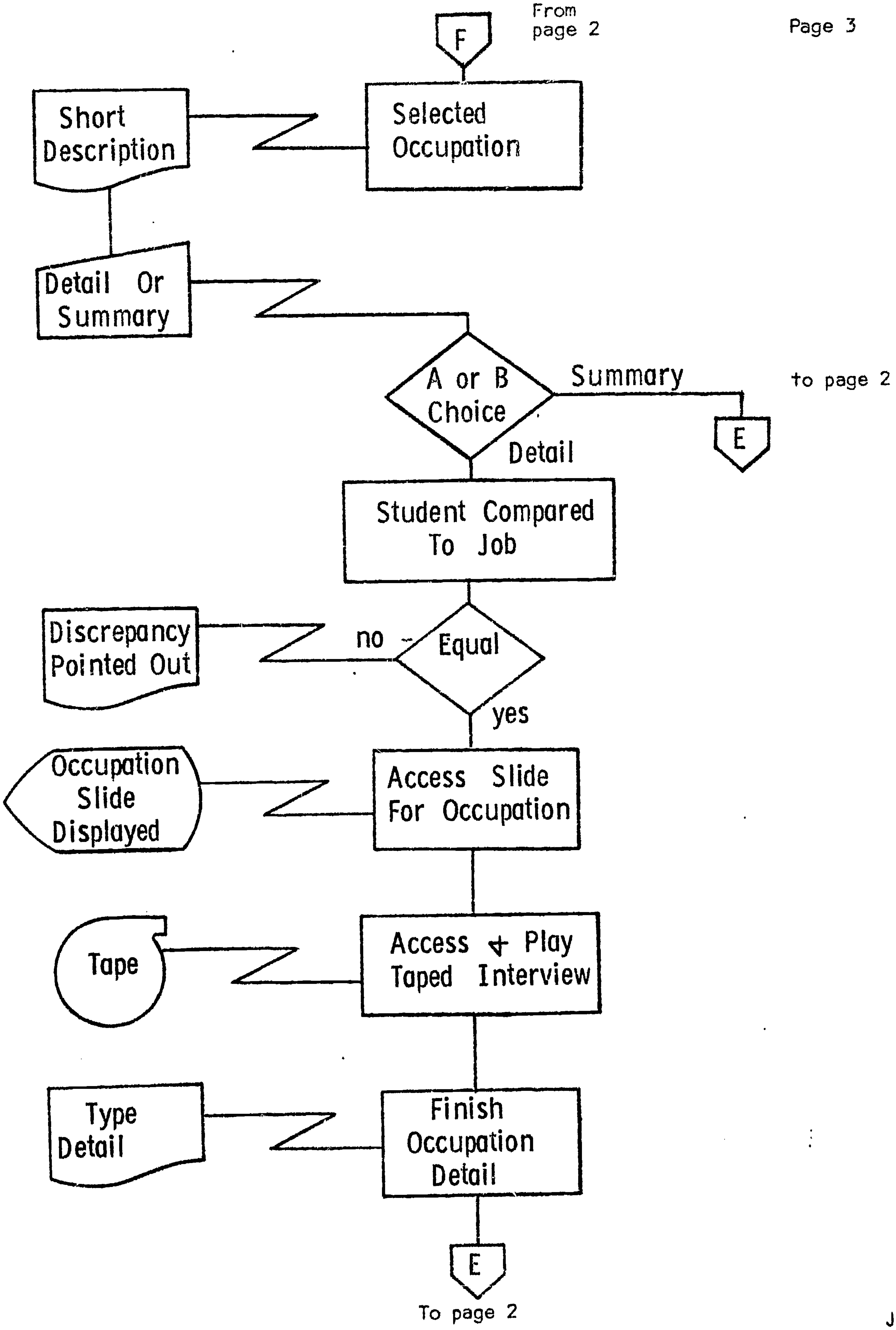
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Student Compared To Job
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Equal
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Occupation Slide Displayed
Access Slide For Occupation
Tape
Access + Play Taped Interview
Type Detail
Finish Occupation Detail
E
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JK/SK
10/13/

CURRENT GUIDANCE APPLICATIONS OF COMPUTERS

Joseph T. Impellitteri
The Pennsylvania State University
August 8, 1967

If one were to stroll through one of the more progressive secondary schools currently in operation throughout the country today he might expect to see many interesting sights. He might observe a number of carrels where individual youngsters or pairs are viewing filmstrips and listening to synchrenized audio tape recordings describing atomic activity in a chemical reaction, while others are watching a movie which explains the growth process of cancerous tissues in an organism. He will certainly see a busy data processing area consisting of at least a small to medium size computer and other auxiliary equipment used for class scheduling and processing of student grades. He might be informed at that point that there were several remote terminals connected to the computer located throughout the building where youngsters could sit down and try out a program they have constructed.

The evidence of television useage would be inescapable during the tour. In fact he just might stumble upon a television studio where programs live and taped would be produced.

If you ever find yourself in this situation, just slightly overawed and aghast at the spectacles you have seen there is a sure method for sobering you up at this point. Ask directions to the guidance office. There, now, that's more like it -- a dusty copy of the 1939 edition of the Dictionary of Occupational Titles on the shelf; the counselor busily at work hand-scoring some Metropolitan Achievement Tests; a well stocked and up-to-date bookshelf including the catalogs of every junior college, college, and university carefully filed from Aarduark Community College to Zulu University, and getting frantic use by twelve

frenzied seniors; and lastly you recognize the familiar $347.00 file of occupational literature (price of file cabinet included) which has yet to feel the first student's anxious grasp. You now find yourself back in a world of reality.

SYSTEMS UNDER DEVELOPMENT

There are, however, several developments underway at this time which could prove to be of great use to the guidance counselor in complementing his current activities. Those I will mention are <u>vocational</u> guidance aids rather than educational or personal guidance aids. Two closely related reasons why the area of <u>vocational</u> guidance is currently attracting the attention of researchers are: (1) the problems are more acute than in the other areas -- the typical academic counselor bound by middle class values and unwilling to cope with problems of career development -- the changing nature of the world of work with its increasing demand for technological knowledge on the worker; and (2) the stimulation of research funding from the 1963 Vocational Education Act.

David Tiedeman and his associates at Harvard are developing an Information System for Vocational Decisions (ISVD) in cooperation with the Newton, Mass. school system and the New England Educational Data System (Needs). When operational as a prototype system (projected July, 1969) it will make use of student and worker characteristics, facts about occupations, education, military service and family. These facts will be placed in computer storage and anyone from a third grader to a 60 year old bricklayer out of a job will be able to make inquiries of the computer through some type of console device, test out tentative decisions on it, and obtain feedback from it.

Frank Minor at IBM working with Donald Super and Roger Myers of Columbia are developing a computer-assisted vocational guidance program

utilizing similar equipment as was seen in the film that was just shown (IBM 1050 terminal connected with an IBM 1400 series computer). The approach they have taken is to proceed with a ninth or tenth grade youngster from his knowledge of various aspects of the world of work, exploration of the concepts of field of work and level of work, and then eventually to discussions of specific occupations within certain fields and levels.

William Cooley, formerly of the American Institutes for Research and now at the University of Pittsburgh has developed a computerized scheme whereby youngsters (ninth through twelfth graders) can obtain actual probabilities of their chances of success in any one of six major fields of work. These data have been developed on the basis of the Project Talent results.

A DESCRIPTION OF THE PENN STATE PROGRAM

At Penn State our purpose is to develop and evaluate a system of presenting occupational information to ninth grade pupils, utilizing the computer-assisted instruction facility currently in operation there. This system will provide a model for a more extensive, extremely flexible, easily updated information-giving system.

One of the most unique features of this system is that of selective presentation of occupational information. The selection of the materials to be presented to the individual student is based on that student's General Aptitude Test Battery (GATB) profile which is stored in the computer memory. Another of its unique features is the manner of presentation of the materials. Not only are materials typed out at the console where the student is to be seated, but also is presented on sound recordings and slide projections, all integrated under computer control.

This system is visualized not as a substitute for the counselor, but as an effective complement to the counselor. It provides the function of information-giving, that portion of the vocational guidance process which counselors are admittedly less adept to handle, and more willing to delegate. The role of the counselor in vocational guidance as presented here in conjunction with this occupational information system is thus revised. His responsibilities no longer include knowledge of specific facts about particular jobs, but instead involve the understanding of the world of work, its relation to individual goals and aspirations, and the ability to communicate effectively with the student in these terms.

The computerized occupational information system may be thought of as a powerful tool of the school counselor in the vocational guidance process. The school counselor must become actively involved if this "tool"

is to be effective. Outside of the vocational guidance process the system has little utility. The system thus will function effectively only in a school where the guidance counselor acknowledges the value of vocational guidance for ninth grade pupils and recognizes the need for them to acquire knowledge about occupations.

The unique advantages of the Computer Assisted Occupational Guidance system are its flexibility and its storage capacity. Its flexibility allows for innumerable changes in the existing system--changes in certain aspects of existing job descriptions such as educational requirements, employment outlooks, or work hours per week; the addition of new job descriptions; or the deletion of certain jobs which are being phased out of existence.

The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable characteristic student profiles. Any changes that occur in jobs and employment opportunities as well as up-dated student information can be immediately entered into computer storage.

In what ways will the computer-based occupational information system more adequately meet the needs of ninth and tenth grade pupils? First, since the interaction is with the student, independent of counselor involvement, all students will be offered the opportunity to obtain occupational information, not only those selected students for whom the counselor has time available. Second, the occupational information that is presented to the students will be accurate and up-to-date, resulting in the more realistic transmission of opportunities in the world of work. Third, the manner of presentation of the occupational materials via typewriter, tape recordings and slide projections will instill greater pupil interest, and consequently greater pupil growth in knowledge of the world

of work. Finally, the selective nature of presentation of the occupational information will result in pupil acquisition of a more adequate picture of himself in relation to the world of work.

Through the development of the system including only a limited number of occupational groupings and specific vocational trade and industrial job descriptions to be presented to ninth grade pupils, it is expected to establish a prototype for a more comprehensive system in the future. Each pupil using the system is allowed to cover as many specific occupations as he has the time and the inclination. Each grouping and specific job he does review, however, will be presented in relation to his own aptitudes and interests. The materials presented is thus pertinent, meaningful occupational information.

The result that is expected is the more realistic, intelligent choice of a vocational goal to give some meaning and direction to the rigorous training and/or rigorous educational pursuits involved in attaining such a goal.

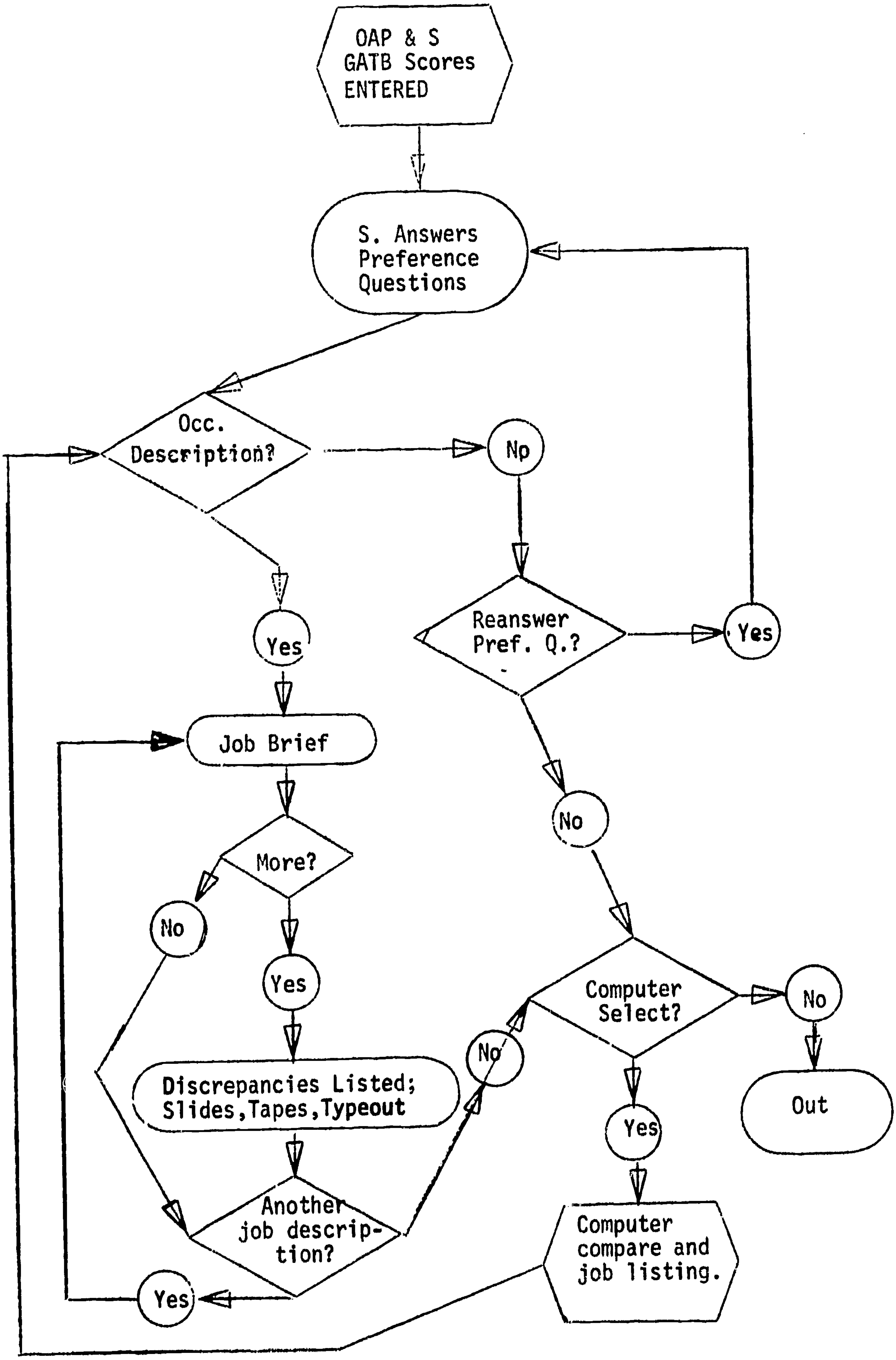
CURRENT USE AND FUTURE DEVELOPMENTS

We have recently tried out a tentative program at Keith Junior High School in Altoona, Pennsylvania with about 75 ninth grade boys who were selected because they had indicated some interest in a vocational or technical training curriculum at the senior high. The program included descriptions (including slides and recorded interviews with workers) of 40 occupations and was designed to operate in accordance with the flow diagram on the following page.

The reactions we received from this group of boys was quite interesting. They felt that the information they received was quite helpful to them. They told us not to get too excited about the slides and tapes we presented -- it was the typeout that they felt was more interesting and important to them. They felt that the length of each session they had at the terminal was much too short (40 minutes). They indicated a preference for one to one and one/half hour sessions at the terminal. Next year we have planned to do more testing of a similar program as that tried out in Altoona. We also are developing a program which includes a more representative sampling of occupations divided into occupational categories.

Hopefully within the next five years we will not only have developed an operational guidance tool but will also be able to provide evidence related to its effectiveness and applicability at the various stages of career development.

S = student
Q = question



TEACHERS, COMPUTERS AND VOCATIONAL EDUCATION

by
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University Park, Pennsylvania
August 2, 1967

INTRODUCTION

A most important step in the solving of any problem is the recognition of the problem. A problem that becomes increasingly more difficult to solve with time can best be solved in its early stages if recognized before it becomes troublesome. Management science has established procedures for this approach but the field of education has not made much use of them.[1] Man has attempted to solve many of his problems with advance warning systems. For example, the science of weather prediction depends on observations and analysis. A lot of impending castastrophes for humans can be minimized with a knowledge of possible forthcoming disasters.

The education of people in the future can be considered to be a developing problem. If one considers the increasing number of students, schools, duration of schooling and emphasis on quality education and then examines the teacher population and predicted figures for teacher training, it then becomes apparent that the figures signify an increasing shortage of teachers. The 1966 class of teacher education graduates numbered over 200,000 potential teachers. The estimated number of new teachers needed in 1966-67 is between 200,000 to 350,000 depending on the criteria used. Even if 80% of the potential teachers enter education, a shortage still will exist. The greatest shortage is in the elementary subject areas, but all are affected.[2]

[1] Bittel, L. R. Management by Exception. New York: McGraw-Hill, 1964.

[2] ________. "A New Look at Teacher Supply and Demand," NEA Research Bulletin. Washington, D. C.: December 1966.

Recent federal programs have created greater teacher demands, and the need for teachers is increasing rapidly. The number of teacher education graduates has not been increasing as rapidly as the demand for them. Certainly education is faced with a problem that should be identified and solved. Education people often do identify this type of problem, but usually little is done. A few forward looking individuals or schools have recognized the need for a solution and have begun investigations. One of the most promising is computer-assisted instruction (CAI). The reader is referred to a review by Gentile for information about CAI.[3]

VOCATIONAL EDUCATION

The shortage of teachers in vocational education is also becoming apparent. Some of the reasons are: industry often pays higher wages for the skill of the journeyman, new vocational and technical programs have been created and encouraged by recent federal legislation, teacher standards are being upgraded to require more academic preparation, a greater student enrollment necessitates more teachers, and a greater knowledge is required by a journeyman because of technological developments affecting the journeyman's trade.

Administrative personnel in vocational education have recognized the problem, but so far have attacked it mostly on a local basis as it affected their institution. For the present this short term solution has kept the shortage out of the critical area for vocational education. Future

[3] Gentile, J. R. "The First Generation of Computer-Assisted Instructional Systems: An Evaluative Review." CAI Laboratory, The Pennsylvania State University, University Park, Pennsylvania. 1966

needs present an even greater problem. A vocational administrator should not have to go on a talent hunt to find the unique individual in a certain trade who wants to teach, but instead should be able to employ from a selection of applicants.

In contrast to education, industry seems to have done a more efficient job of educating workers if one examines surface appearances. One must remember, however, that industry usually trains for one job which usually has narrow concepts. Where more knowledge or skill is required, industry's efforts are very much the same as vocational programs of the public schools.

The output per man hour in industry has been increasing for quite some time and it is primarily because of mechanization. A part of this mechanization has taken place in the information processing area. Bills, paychecks, inventories are all taken care of by a computer and its associated peripheral equipment. It is not uncommon to print bills at the rate of several hundred a minute. The computer does more than process financial accounts; it processes information and can make pre-programmed decisions based on this information.

COMPUTER-ASSISTED INSTRUCTION IN VOCATIONAL EDUCATION

The great amount of interest in the development of computer assisted instruction (CAI) and computerized occupational guidance (COG) has arisen for many good reasons and some bad ones.

A review of deficiencies that most programmed study material has in an ideal teaching-learning situation and a comparison of CAI possibilities can show that CAI is not handicapped by many of these limitations. For example, consider the following capability of CAI. A computer can keep

a cumulative record of the student-computer interaction and make decisions about the student's progress according to the previously determined pattern of the computer program.

The computer, when connected to suitable input and output devices and properly programmed, can provide on-line processing. That is, several users can be entering and receiving information from the computer simultaneously, although each user is aware only of his own activity with the computer.[4]

A computer does not have the limitations of most teaching machines or programmed learning devices in branching ability. The computer is capable of all four programmed teaching modes: a linear sequence, forward, backward and combination branching. The fact that it is done without effort on the part of the student can be a real advantage. The qualities that make the computer a useful teaching device are: speed, user independence, storage capacity, branching-decision capabilities and individualization of treatment to the user.

There are many factors having an influence in determining how valuable computer assisted instruction will be for vocational-technical education. This paper will attempt to point out some of the considerations and problems as recognized by this author's experience and that of others. Gilman has reviewed the use of computer assisted education for technical education as performed at The Pennsylvania State University.[5] Many of the advantages of CAI are pointed out by this article.

[4]Burgess, E. On-Line Computing Systems. Detroit, Michigan: American Data Processing, Inc. 1965.

[5]Gilman, D. A. "Computer Assisted Instruction for Technical Education," School Shop.

An examination of the process used to establish a course immediately points out some of the disadvantages. The time necessary to prepare the course is a major difficulty facing educators. A procedure similar to that in preparing programmed instruction material is used. However, even after the material prepared in this form much more work remains to be done. Programming for the computer takes manpower and additional time. This aspect illustrates that it is not practical to develop CAI programs for courses involving a few students over a long period of time. After a course is developed it requires little attention except for revisions. Thus, a balance must be attained in student-use vs. effort expended in development. of a course. Once the minimum use criterion is met or exceeded, the teaching load can be borne by the machinery instead of by classroom teachers. The computer then can be one of the solutions to the upcoming shortage.of teachers. Coulson has said, "Individualized instruction by computers and by other self-study techniques will certainly require drastic changes in the role of the teacher. His job will no longer be primarily to present information and to drill students. He will spend most of his time in diagnosing individual learning problems, remedying them in close tutorial interactions with the pupils, and leading group discussions."[6] It appears that teachers will still provide personal contact and group interaction, but will do so without the traditional class lectures. The replacement of this portion of the teacher's time frees more time for other areas, thus enabling a larger body of studbnts to be served by one teacher.

[6]Coulson, J. E. "Automation, Electronic Computer, and Education," Phi Delta Kappan, March 1966.

Remedial teaching can also be handled by the computer where the program is directed by the students knowledge instead of the teachers interpretation, thus relieving the teacher of the time consuming review in class. Bright has covered much of what has just been mentioned about the changing role of the teacher.[7]

Another benefit to the teacher and to educational knowledge is the record generated by the computer of the student's performance.[8] The records produced can be used by a teacher to monitor the student's progress at every point, not just on testing days or by occasional observation. This continuous record will provide detail never before possible on the student learning process.

The use of CAI in vocational education would not necessarily represent the best method of solving the described problems, but would represent the most efficient use of various methods that are more effective in combinations; these have been suggested by Suess.[9] The computer can control audio, visual and graphic display devices according to the programming supplied which, therefore, allow material to be presented by the best method or combination of methods. This is a reason why CAI is more efficient, flexible and adaptable than programmed texts or other devices.

CAI will be capable of more things than at present, as the hardware, software and philosophic developments come about. Becker states CAI at

[7] Bright, R. L. "The Place of Technology in Educational Change," Audiovisual Instruction, April 1967.

[8] Bundy, R. F. "Computer-Assisted Instruction Now and For the Future," Audiovisual Instruction, April 1967.

[9] Suess, A. R. "The SNAUF Regarding Teaching Methods in Industrial Education, Journal of Industrial Teacher Education, September 1966.

present does not have the impact that it will in the future.[10] Becker also points out in this article that vocational education "will be profoundly influenced by computer technology." It is suggested that training in the schools can be better aligned with job requirements and opportunities. The methods of simulation and learning games are suggested as vehicles with promise.

On the other hand, Strum and Ward have cited some of the drawbacks in nn the use of CAI in the engineering field, which would also pertain to technician education.[11] Some of the difficulties are in presenting material that is mathematical in nature or that requires graphic display. Some of the criticisms voiced in this article pertain only to early versions of CAI hardware. Future equipment will be more flexible. Cathode ray tube (CRT) display will permit complicated expressions to be easily shown, whereas the typewriter has difficulty with these expressions.

A side comment may be included here. Childs has stated that man will run machines, but that the machinery will do the work.[12] The human element will be reduced to providing instructions to machines. This can probably be extended to say that machinery will be run by data-terminals similar to those used in CAI, a technique already employed to an extent by industry. The education of the student through simulation and other means in CAI will fit him for employment in tomorrow's industry where manipulative skills will probably be of less importance than today.

[10] Becker, J. W. "It Can't Replace the Teacher--Yet," Phi Delta Kappan, January 1967.

[11] Strum, R. E. and Ward, J. R. "Some Comments on Computer-Assisted Instruction in Engineering Education," IEEE Transactions on Education, March 1967.

[12] Childs, G. B. "Is the Work Ethic Realistic in an Age of Automation," Phi Delta Kappan, April 1965.

IBM has cited advantages felt to be possessed by CAI.[13] The three important ones are: higher rates of retention, acceleration of curriculum and training and uniformly high teaching standards. If future research continues to support these premises, CAI is the future of education.

13 __________. "IBM 1401, 1440, or 1460 Operating System Computer Assisted Instruction," IBM Systems Reference Library, March 1965.

INTRODUCTION TO COG

Prepared by Francis J. Paolone
Graduate Assistant
Department of Vocational Education
September, 1967

(for the research project)

The Development and Evaluation of a Pilot
Computer-Assisted Occupational
Guidance Program*

*With support from the Pennsylvania Department of Public Instruction

IMPORTANCE OF WORK

What do you want out of life? What do you expect to contribute to society during your lifetime? Perhaps these questions have never entered your mind. If not, you should now be considering them. In doing so, you will realize that to answer these two questions you must consider the place of work in your life. It is a necessary and factual part of life. Yet most people seem to take work for granted. They do not fully realize what the world of work means. Our ideas about work are rarely examined.

Work has come to have a very central significance in our economic and social thinking. Work is necessary, work is desirable, work is good. Our society considers it only natural that each member enter the labor force. Once you become a full-time participating member in the world of work you can expect to spend about eight hours a day, five to seven days a week on the job. This will amount to practically one-third of your adult life devoted to your work. Certainly, then, if work is going to be a great part of your life, it is important that you become familiar with occupations. Only then can you make a careful and educated choice of the kind of work you wish to do during your lifetime.

The importance of work can be fully realized when you consider the following six ways in which the work you choose may affect you.

(1) the occupation you choose may determine whether you will be employed or unemployed. Some occupations are seasonal in nature or they offer only limited opportunities for employment. Other occupations may employ workers all year and provide job security.

(2) The occupation you choose may determine your success or failure. People differ in both the nature and level of their abilities and desires. Occupations differ in the abilities and efforts required for acceptable performance. By selecting a job that will utilize your strengths and make only minimum demands of your weaknesses, you will increase your chances of success.

(3) The occupation you choose may determine whether you like or dislike your work. Your individual interests and values play a large part in the amount of satisfaction you get out of your work. However, most occupations have some duties that you may not enjoy doing. A part of job satisfaction is to recognize both of these facts.

(4) The occupation you choose may determine your contribution to society. Your choice of a job will determine to a great extent not only what you will contribute to society, but also what others think of your contribution.

(5) The occupation you choose may affect your physical and mental health. In general, it will certainly influence the kind of person you become.

(6) The occupation you choose may determine the people with whom you will associate, where you will live, your choice of friends, how often you will see your family, and the wages or salary that you will earn. In short, the occupation you choose may influence every aspect of your life.

WHY STUDY ABOUT OCCUPATIONS?

If you still wonder why it is important to learn about the world of work, consider the following. After your schooling is finished, you face

the necessity of making a living and of becoming self-supporting. Therefore:

To make a wise choice of an occupation, you must know something about all fields of work; choice can be made only by comparison; to make a knowledgeable choice of new opportunities, you must understand the direction that new occupations are taking; to be able to adjust to new methods and new demands, you must know how occupations change, why some disappear, and why others grow; to learn how your future job will be related to other occupations, you should know how occupations are dependent upon each other; to learn which jobs are always available that may be used as stepping stones to other work, you should know about all the occupational groups; to make a wise choice of work, you must understand your own interests; to learn the nature of the preparation needed for entrance to different occupations, you need to make a systematic study of the world of work; and finally, to learn about the differences in opportunities for employment on the local, state and national levels, you need to study about the world of work. These are but a few of the purposes for investigating and exploring the world of work.

WHY GO TO WORK?

There are also basic reasons why people must work and which will be important to you in years ahead.

(1) Livelihood - man works to provide his family and himself with the essentials of life . . . food, clothing, shelter.

(2) Human Relationships - working is a means of associating with people who have similar interests and being part of a group gives man a feeling of belonging.

(3) Personal Development - man's work can provide him with an opportunity to learn and to grow intelliectually and socially--to reach his fullest potential;

(4) Service - man likes to feel that the work he does is important and is of value to others.

(5) Security - man wants stability in his life in order that he can make realistic and effective plans for the future.

(6) Success - man needs something by which he can distinguish himself, and employers want people who like a challenge and who have the drive to be successful in life.

Thus, your work is the gateway to meeting and fulfilling your needs in most areas of living. Your daily occupation will act as one of the greatest influences in your life.

WHY OCCUPATIONAL EXPLORATION?

From childhood on, the individual is often asked, "What do you want to be?". For some of you the answer is the same now as it was when you were a yougster. However, for most people, the process of reaching this decision involves much more. At this present stage in your life you need to be able to make tentative decisions and have flexibility in your career goals. After investigating an early choice you may change your mind when you find out more about the work and the preparation for it. People of different ages and experiences choose according to their sense of value at the time. Hence, your decisions may be constantly changing. For this reason you must <u>investigate</u> and <u>explore</u> the world of work now before committing yourself to a particular job.

Before you can choose anything intelligently, you must have some basis for your choice. In order to make an occupational choice you will need reliable information on which to base your decisions. Only

by learning about occupations can you expect to acquire the facts which you will need to evaluate the job. If you have several possibilities in mind you must know enough about each to select the one that suits your needs, abilities, and interests better than the others; one that stimulates your sense of values. This means that you must explore the world of work in order to understand it and yourself.

As you learn more about the fields of occupations and the methods of preparing for work, the easier it will be for you to find a suitable occupation and make a satisfactory adjustment on the job. As you learn more about yourself and the world of work you will try to analyze factors within you and within the job that seems to suit your individual needs.

QUALIFICATIONS FOR THE WORLD OF WORK

This process of choosing a vocation is too important (as pointed out earlier) to be done haphazardly. As you become more aware of yourself and the different job environments you will develop "maturity" in the area of vocational decision making. During this process of vocational exploration you should consider these five factors:

(1) Knowledge.

There is much information about occupations in general and about any particular job which you might have in mind. Since you must make your own decisions, you should know the "facts" and base your decisions on the best information available to you.

(2) Aptitudes and Skills.

Individuals possess natural abilities (aptitudes) to do certain things. Individuals can also learn how (skill) to perform

certain tasks. These aptitudes and skills can be either physical or mental in nature. Hobbies and past work experiences and grades in school subjects are a source of finding out your own particular talents. If you have special aptitudes and/or skills, consider how you can relate them to an occupation. If you are aware of what you are capable of doing, and if you are to succeed in an occupation that will be satisfying your choice should fit you as an individual and make use of many of your individual talents.

(3) Interest.

People enjoy most, and do best, the things which they like, you may have one specific interest or many varied ones. Your interests may also expand as you grow older and as you participate in new and different kinds of activities. Reflect upon yourself to make sure your interests are deep, permanent, and lasting ones, because they may change as you mature. Some occupations which appeal to you now many not appeal to you later in life.

(4) Physical Make-Up.

Different careers and jobs make different demands on the health, strength, and stamina of the individual. People who have physical or health problems should recognize their handicaps for what they are and should choose careers that are in keeping with their limitations. Take a good look at the way you see yourself in relation to the people and things around you. Your self-concept will be the way that you see yourself in the occupation you choose. An occupation should provide you with a satisfying self-concept of yourself as a worker.

(5) Desire.

Wanting to succeed, concentrated effort, and the motivation to do well may overcome a handicap. Likewise, the desire to be a particular kind of worker may lead you to like the training and education which will offset your lack of ability (aptitude) that the job requires. Thus, much of your success in a particular occupation will be based on the enthusiasm and the desire that you bring to the job.

WHERE ARE YOU NOW?

WHERE ARE YOU HEADED?

There are several important decisions you will be making in the near future. These decisions may affect your entire life; so they need to be based on the facts and sound thinking formed after thorough investigation and exploration.

While in ninth grade you are required to make a curriculum choice (Academic, Vocational, Business, General, etc.) to enter a specific course of study. This will have some important implications to your life in terms of an eventual career for yourself. Therefore, you need to have the information and self-appraisal to help you make course and occupational selections which are suitable for you.

The following are sources of information available to help you broaden your knowledge of yourself and the various occupational fields:

a. Guidance Counselors
b. Publications (Books-Pamphlets Magazines)
c. Bureau of Employment Security
   United States Department of Labor (State Employment Service)
d. Parents
e. Teachers
f. Friends, Relatives
g. Persons employed in an occupation

Keep in mind that these sources should be used for assistance and guidance, not to make decisions for you. To further help you get an idea of how to be more logical and organized in your tasks of vocational exploration and decision making, you will be making use of a computerized occupational information system. This system will provide you with only a brief glimpse into the world of work and only a limited opportunity to "see" your own characteristics. If more detail is wanted, there are other sources available (mentioned above), and certainly, your guidance counselor, Mr. , can assist you.

OCCUPATIONAL GUIDANCE

To help you in this process of investigation and exploration of yourself and the world of work, we have provided for your use an informational system. This system consists of two parts; (1) the terminal--which you will be operating, and which contains the typewriter, the typeout sheets, the tape-recorder, and the photographic slides and projector and screen; (2) the computer--which is located at the main campus of The Pennsylvania State University, and which contains the stored information about jobs, your aptitude scores, and the programmed instructions for operating the system.

Some knowledge about the world of work will come from the information about the particular jobs which you will explore within this system. This information was obtained from various kinds of occupational literature, from tape recordings of workers on the job, and from pictures of workers on the job. This phase of the system presents such job information as:

Entry Qualifications - education and training necessary.

Duties - the kinds of activities the worker performs

Salary - beginning salary and the highest possible level.

Working Conditions - the physical surroundings and situations which the worker will encounter.

Employment Outlook - the potential for year-round work, advancements, and future trends.

You must remember, however, that these are nation-wide job descriptions and that they give just a glimpse into the world of work. If more detail or local job information is desired, there are other sources which your counselor, Mr. , may provide for you.

As you may recall, there are other factors to consider in the process of vocational exploration; factors such as Aptitudes and Interests. These two kinds of information are also stored within the system, in the form of your scores on the General Aptitude Test Battery and your responses to five Preference or Interest Questions. The results from your testing with the G.A.T.B. include nine aptitude scores which give a pretty good indication of your natural ability in such areas as:

G - Intelligence - general learning ability. The ability to "catch on" or understand instructions and underlying principles; the ability to reason and make judgements.

V - Verbal Aptitude - the ability to understand meaning of words and to use them effectively; the ability to see relationships between words and understand meanings of whole sentences and paragraphs.

N - Numerical Aptitude - the ability to perform arithmetic operations quickly and accurately.

S - Spatial Aptitude - the ability to visualize geometric form and to comprehend the two-dimensional drawings of three-dimensional objects.

P - Form Perception - the ability to see detail in objects or pictures; ability to make visual comparisions and see slight differences in shapes and shadings of figures.

Q - Clerical Perception - the ability to see detail, to observe differences in copy, to proofread words and numbers.

K - Motor Coordination - the ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements.

F - Finger Dexterity - the ability to manipulate small objects with the finger, rapidly or accurately.

M - Manual Dexterity - the ability to move the hands easily and skillfully; the ability to work with the hands in placing and turning motions.

For each job you investigate, your GATB scores are compared with the score requirements necessary in each of the above areas in order to successfully perform the duties related to that job. These "requirements" are the standards or norms which indicate the levels of abilities that the "average" or "typical" worker needs to be able to perform the tasks associated with the job. Thus, you can determine if your abilities are High, Medium, or Low in comparison to the workers already in that particular occupation. If you wish to have further discussion on or interpretation of your test results, consult with your guidance counselor.

Tests are useful in indicating some natural talents and in showing how you compare with others. However, whether your abilities are varied or few, high or low, you must still have the Desire to do well and the Interest in the work. Aptitudes combined with Interests help you to gain Skills. So, to further your self-appraisal, you must be aware of your interests (or preferences). This leads us to the second kind of information about you which can be stored within the computer and used as a basis for comparison. The purpose here is to see where your work preferences are similar to or different from the actual job environment. The five Preference Questions to which you will have an opportunity to express your interests are:

(a) Which of the following best describes your current plans?

1. Not to graduate from high school.
2. Graduate from high school.
3. Take vocational or technical courses.
4. Attend a two-year college program.
5. Attend a four-year college.

(b) What kind of working conditions would you prefer?

1. Indoor
2. Outdoor
3. Indoor and Outdoor Mixed

(c) Which of the following best describes your desire?

1. Work alone
2. Work with people
3. Sometimes alone, sometines with people

(d) Do you like to plan your work or have someone tell you what to do?

1. Prefer to plan or direct other people
2. Like to be told what I am to do
3. Plan work under supervision

(e) Do you want a job requiring physical activity?

1. Yes
2. Some activity
3. No
4. It doesn't matter

Any differences between your responses to the Preference Questions and what the job environment actually is will be stated on the typeout sheet. Likewise, any differences between your aptitudes and what the job requires will also be printed on the typeout sheet. Thus, you may compare for yourself your Abilities, Interests, Physical Make-Up and Desire with your Knowledge of the conditions to be expected on a particular job.

Since your Aptitudes (natural Abilities) do not change (although you may develop certain learned skills), your same G.A.T.B. scores can be compared with the different requirements of each occupation that you

investigate. However, because your Interests may be continuously changing, you may want to respond differently, at different times to the five Preference Questions. And so, you will be given the opportunity to reanswer these same questions, if you so desire, before the start of each new exploration.

There will be made available a list of occupations which you can investigate. When you select an occupation to explore, you will first be presented with a short introductory paragraph explaining and defining that job. This is done to allow you to get an "idea" of the occupation without taking up a lot of time fully exploring those jobs that do not appeal to you, or match your preferences, or fit in with your aptitudes. After this brief "look" into the job, you may then go into more information about it . . . or pick another occupation for exploration. At this stage of investigation you will always have three options of: getting more information about the selected job; selecting another occupation; or reanswering the five Preference Questions.

When you choose to find out more about a particular job, the occupational information stored within the computer will be presented by means of the typeout sheet, the slide pictures of workers on the job, and the tape recordings of workers on the job. As stated before, this phase of the system contains such job information as Entry Qualifications, Salary, Duties, Working Conditions, and Employment Outlook.

There is one feature of this system that is noteworthy, and that is the "none" selection. This choice is available whenever you do not have a definite occupation in mind that you want to investigate. By choosing this "none" option, you instruct the computer to compare your five

Preference responses and your nine Aptitude scores with each and every job profile (the job profile is the total information about the job environment and the Aptitudes needed for the "average" worker.) This comparing is done for every occupation on which information is stored within the computer.

When this task of comparing is completed, the titles of those jobs which are appropriate to your Aptitudes and Preferences are then printed for you. This listing simply indicates the jobs for which you can easily qualify, based on your Aptitudes scores and your responses to the Preference Questions. This procedure is made available to help you recognize the possibilities that seem to suit your needs, interests, and abilities. However, you must still explore these work areas (as well as others) to learn about the factors within you and within the job; factors which must be evaluated to insure a satisfying decision on your future occupation.

The procedures and the kinds of information used in this system are based on the analysis of important job data and the analysis of required worker traits. You are already familiar with the five categories of occupational data which should be known to become informed about the world of work:

Entry Qualifications - education and training necessary

Salary - beginning and averages and the highest possible

Duties - what is expected of the worker

Working Conditions - what the worker can expect in the job environment

Employment Outlook - present situation and future trends

The worker traits are those necessary abilities and personal characteristics which you should have in order to achieve average successful

job performance. These traits can be viewed from six categories which provide a framework around which you may organize your self-appraisal and occupational information:

(1) The amount of general educational development and specific vocational preparation you desire compared to what the job requires.

(2) The specific abilities and characteristics you have compared to those required in order to learn or perform the tasks and duties associated with the job.

(3) The preferences for certain kinds of work activities or experiences which are considered necessary for job success.

(4) Types of occupational situations to which an individual must adjust.

(5) The physical activities required in different work situations.

(6) The physical surroundings one will encounter in different jobs.

SUMMARY

If you think that appriasing yourself in relation to a career is a complex problem, you are correct. Yet it is done every day of the year by thousands and thousands of people. The task can be made easier by a systematic exploration of yourself and the world of work.

Any decisions that you make should be made on the basis of what the outcome of each decision is likely to be. If your decisions are based on facts and sound thinking, the outcomes will probably be satisfying. Decisions of great importance take time and proper study.

No matter what system is used to obtain and organize information, you must make your own decisions based on your own convictions about job advantages and how they fit your own Needs, Abilities, Interests, and Values then you must be prepared to adjust to the circumstances or outcomes of those decisions. Certainly, this is a major step in the direction of maturity and self-dependence. Remember, the occupation you choose affects many phases of your life!

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COMPUTER ASSISTED
OCCUPATIONAL GUIDANCE*

by

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1. BACKGROUND

Because of the increasing complexity of the work world in which we live it becomes essential to take a hard look at the guidance program found in our schools. The school counselor is the person whom we rely upon to help our young people understand the world of work and to help them explore their places in it. The great importance of occupational information as a means of aiding the counselor in this task has been acknowledged (Hoyt, 1964; Baer and Roeber, 1964; Hoppock, 1963).

In relying upon the counselor as the primary resource to gather, sort, validate and transmit the tons of literature covering thousands of occupations we are not being realistic. We are asking counselors to accomplish an impossible task, one that is ill suited to his nature and capabilities. But what other, more effective ways are available to do the job?

Many efforts have been made to provide pupils with occupational information utilizing more effective, more attractive, and novel methods. Kenyon (1952) has reported the results of a community effort in this area using tape recordings of occupational descriptions, requirements for entry into the occupation, and local employment opportunities. Another example of the use of tape recorders in transmitting occupational information is reported by Rundquist (1958). In this latter instance recordings were made of actual workers in occupations answering questions about their jobs.

Closed circuit television has been utilized in Washington County, Maryland in an attempt to convey occupational information to a large number (8000) junior and senior high school pupils (Beachley, 1959). A combination of two methods of presentation, colored slides of fifty local occupations, synchronized with a taped commentary describing the duties, training, and working description of these occupations has been reported by Meagher (1955).

All of the methods described above have at least one major limitation. That is, the same occupational or career information is presented to all of the pupils involved. Thus, the pupil with low academic ability and potential, and possessing little interest in mathematics and the sciences must submit to a period of boredom when the occupations of surgeon, engineer or research chemist are being described.

The computer-based occupational information system has been designed to overcome the limitations of these various methods through selective presentation of the material to individual pupils. It is the result of the refinement and integration of two prior approaches to improve vocational guidance.

The first approach is exemplified by the novel methods of presentation described above. The value of the novel presentation of occupational information to pupils has been thoroughly acknowledged and has consequently been fully utilized in the current system. The refinement of this approach has been attained by capitalizing on the flexibility of the computer system. First, the system is designed to allow a goodly amount of pupil participation in the interactive process. Secondly, not only are colored slides and tape recordings utilized, but also a typed record of the content of the session is obtained to which the pupil may

refer at any future time. The third refinement is to permit an unlimited increase in the number of occupational descriptions in computer storage.

The second approach which has contributed to the development of the system was that devised by Hull (1925). At that time Hull reported a "comprehensive system of vocational prognosis" (Hull, 1925). His system involved: (1) the categorization of all occupations into 40 vocational groups or "type aptitudes"; (2) the administration of 30-40 distinct tests which would comprise a "universal battery" to great numbers of workers; (3) the development of 40 regression equations utilizing the test measures as predictors, and success in the 40 occupations as the criteria; (4) the use of machine to solve the 40 regression equations for each individual based on his aptitude test scores--" . . . the machine will solve in immediate succession a large number of different equations each yielding a forecast for a different vocational aptitude, <u>all equations being based upon one and the same battery of tests</u>" (Hull, 1925); (5) the individual finally examines his predicted scores on each of the 40 occupations to determine which occupations provide both his least chance of success, and greatest chance of success; (6) "The three or four most promising vocations thus emerging may be given further investigation" (Hull, 1928); and (7) from this information the individual may choose his life's work.

Hull foresaw the difficulties involved in promoting his system in stating, "It scarcely needs to be pointed out that the program of vocational guidance thus briefly sketched is a revolutionary departure from the current development of aptitude testing. This being the case, there will no doubt be considerable inertia and resistance from conservative quarters." (Hull, 1928).

Prophetically, though, he added the following, "But the logic of the situation is certain to triumph in the end. We may look forward with confidence to a day not far distant when some such system as that sketched above will be operating in every large school system. Then, and not until then, will there be possible a genuine vocational guidance for the masses of the people" (Hull, 1928).

Hull's approach was refined in the current system by utilizing current computer advancements, and by dependence upon a less empirical approach to occupational exploration. The use of equations based on test scores to predict success in specific occupations is a desirable goal, but at present is not feasible. The data needed for developing such equations are not available--reliable criterion measures of job success, the actual relationship between scores on a variety of interest and personality dimensions and degree of job success, and the relationship between measured aptitudes and job success, for each of the occupations and their groupings.

The data that are available, and consequently have been planned for use in the present system, are minimum scores required on each of the subtests of the General Aptitude Test Battery and other minimum worker trait requirements essential to minimal success within the occupational grouping listed in the 1965 revision of the Dictionary of Occupational Titles. Generally, the computer is programmed to compare minimal aptitude requirements for the occupational grouping (intelligence, verbal, numerical, spatial, form, clerical, motor coordination, finger dexterity and manual dexterity) with an individual's scores on these subtests. The "G" aptitude or intelligence as measured

on the GATB is compared first, and descriptions of occupational groupings which require the greatest degree of that specific aptitude for which the individual qualifies are presented.

Over thirty years ago Bingham proposed the importance of the information function of the counselor.

> It is not a function of counseling to decide for what calling a youth shall prepare. That is his own responsibility and his right. It is the counselor's responsibility to place at the young man's disposal the best information available, including the most reliable estimates of future opportunities it is possible to assemble (Bingham, 1934).

Three decades later Hoyt has reiterated the same theme.

> It seems to me that the time is here for a rededication to the information function in guidance. Because information has been shown as not <u>sufficient</u> for meeting the counseling and guidance needs of students does not mean that it is not <u>necessary</u>. Because students in high school today are apt to change occupations more than once in their adult life does not mean that there is no need for them to make some specific occupational plans now. Because it takes a great deal of counselor time to keep up to date on occupational and educational information does not mean this function should be abandoned nor greatly neglected.
> . . . Because providing information to students is not exciting does not mean it is not a worthy counselor function. If service to students is to take precedence over satisfaction of status as a counselor need, then this re-emphasis must take place.
> (Hoyt, 1964).

In accepting the necessity and importance of occupational information, and looking ahead a bit to a time when such information can be effectively stored and utilized, Baer and Roeber have commented:

> Computer technology may have a significant impact on counseling and placement. With the aid of computers, counselors and personnel workers will be able to interpret great quantities of data concerning an individual's aptitudes and interests and other aspects of his background in relation to a wide range of occupational possibilities. Such computers will not take the place of the counselor's judgment in guidance and placement. They will digest, analyze, and array information upon which a proper judgment can be based. (Baer and Roeber, 1964).

A DESCRIPTION OF THE SYSTEM

The purpose of this study is to develop and evaluate a system of presenting occupational information to ninth grade pupils, utilizing the computer-assisted instruction facility currently in operation at The Pennsylvania State University. The purpose of the system is to provide a model for a more extensive, extremely flexible, easily updated information-giving function.

One of the most unique features of this system is that of selective presentation of occupational information. The selection of the materials to be presented to the individual student will be based on that student's General Aptitude Test Battery (GATB) profile which is to be stored in the computer memory. Another of its unique features is the manner of presentation of the materials. Not only will materials be typed out at the console where the student is to be seated, but also will be presented on sound recordings and slide projections, all integrated under computer control.

This system is visualized not as a substitute for the counselor, but as an effective complement to the counselor. It can provide the function of information-giving, that portion of the vocational guidance process which counselors are admittedly less adept to handle, and more willing to delegate. The role of the counselor in vocational guidance as presented here in conjunction with this occupational information system is thus revised. His responsibilities no longer include knowledge of specific facts about particular jobs, but instead involve the understanding of the world of work, its relation to individual goals and aspirations, and the ability to communicate effectively with the

student in these terms. "Matching persons and jobs successfully requires not only information but also a high degree of interviewing skill and a respect for the individual's ability to guide himself." (Strang, 1950).

The computer-based occupational information system may be thought of as a powerful tool of the school counselor in the vocational guidance process. The school counselor must become actively involved if this "tool" is to be effective. Outside of the vocational guidance process the system has little utility. The system thus will function effectively only in a school where the guidance counselor acknowledges the value of vocational guidance for ninth grade pupils and recognizes the need for them to acquire knowledge about occupations.

The Interactive Situation

From Figure 1 it is apparent that the only pupil interaction occurs at the typewriter. Thus, any request the pupil makes is by typing

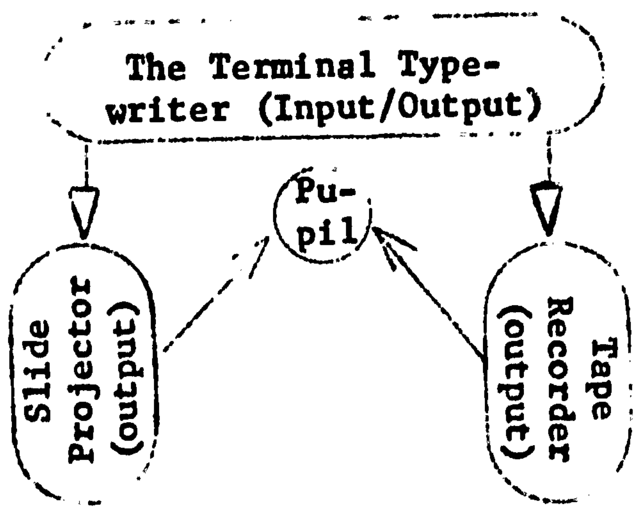


Figure 1. The Interactive Situation

such a request. The computer responds to a valid request in any one of the combinations of the three output devices: by typing the requested information, by projecting selected slides, or by activating the tape recorder.

The Specific Functions of the Computer Components

A. The Typewriter

To provide a record of pertinent information which the subject may take with him--the particular job/s described, a list of apparent discrepancies between specific job requirements and the individual's qualifications, books which may be read, and other references.

To provide an input to the system.

B. The Tape Recorder

To introduce a more personal kind of communication by narration.

To provide a 5-minute narrative orientation to the system and its purpose, and to establish the need for occupational information.

To more nearly simulate the counseling situation.

To provide information about jobs in a more attractive manner than typing such information.

To provide actual sounds typically indigeneous to the environment for certain jobs (in phase with slides).

To present actual workers' comments on the advantages and disadvantages of specific occupations.

C. The Slide Projector

To present the worker performing typical tasks in the job situation.

To present graphically, employment outlook projections.

To present blueprints, electronic circuitry, and other diagrams which are pertinent to particular occupations.

ADVANTAGES OVER CURRENT SYSTEMS

The unique advantages of the Computer Assisted Occupational Guidance system are its flexibility and its storage capacity. Its flexibility allows for innumerable changes in the existing system--changes in certain aspects of existing job descriptions such as educational requirements, employment outlooks, or work hours per week; the addition of new job descriptions; or the deletion of certain jobs which are being phased out of existence.

The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable characteristic student profiles. Any changes that occur in jobs and employment opportunities can be immediately entered into computer storage.

In what ways will the computer-based occupational information system more adequately meet the needs of ninth and tenth grade pupils? First, since the interaction is with the student, independent of counselor involvement, all students will be offered the opportunity to obtain occupational information, not only those selected students for whom the counselor has time available. Second, the occupational information that is presented to the students will be accurate and up to date, resulting in the more realistic transmission of opportunities in the world of work. Third, the manner of presentation of the occupational materials via typewriter, tape recordings and slide projections will instill greater pupil interest, and consequently greater pupil growth in knowledge of the world of work. Finally, the selective nature of presentation of the occupational information will result in pupil acquisition of a more adequate picture of himself in relation to the world of work.

SUMMARY

Through the development of the system including only a limited number of occupational groupings and specific vocational trade and industrial job descriptions to be presented to ninth grade pupils, it is expected to establish a prototype for a more comprehensive system in the future. Each pupil using the system is allowed to cover as many occupational groups, and as many specific jobs within the groups as he has the time and the inclination. Each grouping and specific job he does review, however, will be presented in relation to his own aptitudes and interests. The material presented is thus not mere occupational information, but pertinent, meaningful occupational information.

The result that is expected is the more realistic, intelligent choice of a vocational goal to give some meaning and direction to the rigorous training and/or rigorous educational pursuits involved in attaining such a goal.

PROGRESS ON THE DEVELOPMENT

OF THE SYSTEM AS OF

July 1, 1966

1. Seventy-five per cent of the interviews of workers in specific occupations have been collected, as well as the same percentage of photographs taken of these workers at their jobs.
2. Prepared occupational descriptions of the 100 selected occupations have been collected, from various sources. Approximately 25 abstracted occupational descriptions for inclusion in the computer program have been completed.
3. The computer program itself (less the specific descriptions to be included) has been completed.
4. Work has begun on the construction of various measuring instruments:
   A. A pupil reaction inventory--to gauge the psychological reaction of pupils to the computerized system.
   B. A test of career decision making ability--to be utilized as a criterion device
   C. A test of recall, recognition and retention of specific occupational information to be utilized as a criterion device.
   D. An inventory of pupil values--to be utilized in determining the relationship between personal values and factors considered important in making career plans.

FUTURE TIME SCHEDULE

1. Completion of the development of the system by November 1, 1966
2. Field trial of a group of 200 ninth grade students from November 1, 1966 to March 30, 1967.
3. Revision of the system to be completed by September 1, 1967.
4. Final field trial and evaluation to be completed between September 1, 1967 and June 30, 1968.

SOME EXPLANATORY COMMENTS ON THE OPERATION OF THE COMPUTER ASSISTED OCCUPATIONAL GUIDANCE SYSTEM

1. What is the purpose of the current pilot development proposal?

   To develop and evaluate CoBOIS utilizing a limited sample of occupational groupings and specific jobs within those groupings involving a restricted sample of subjects.

2. What possible implications might arise from this project?

   There are two possible alternative implications, both dependent upon the outcome of the evaluation of the project. Either it will be suggested that the system should be further expanded and field-tested, or it will be suggested that further expansion of the system not be considered. The probability of the former clearly is greater than the latter.

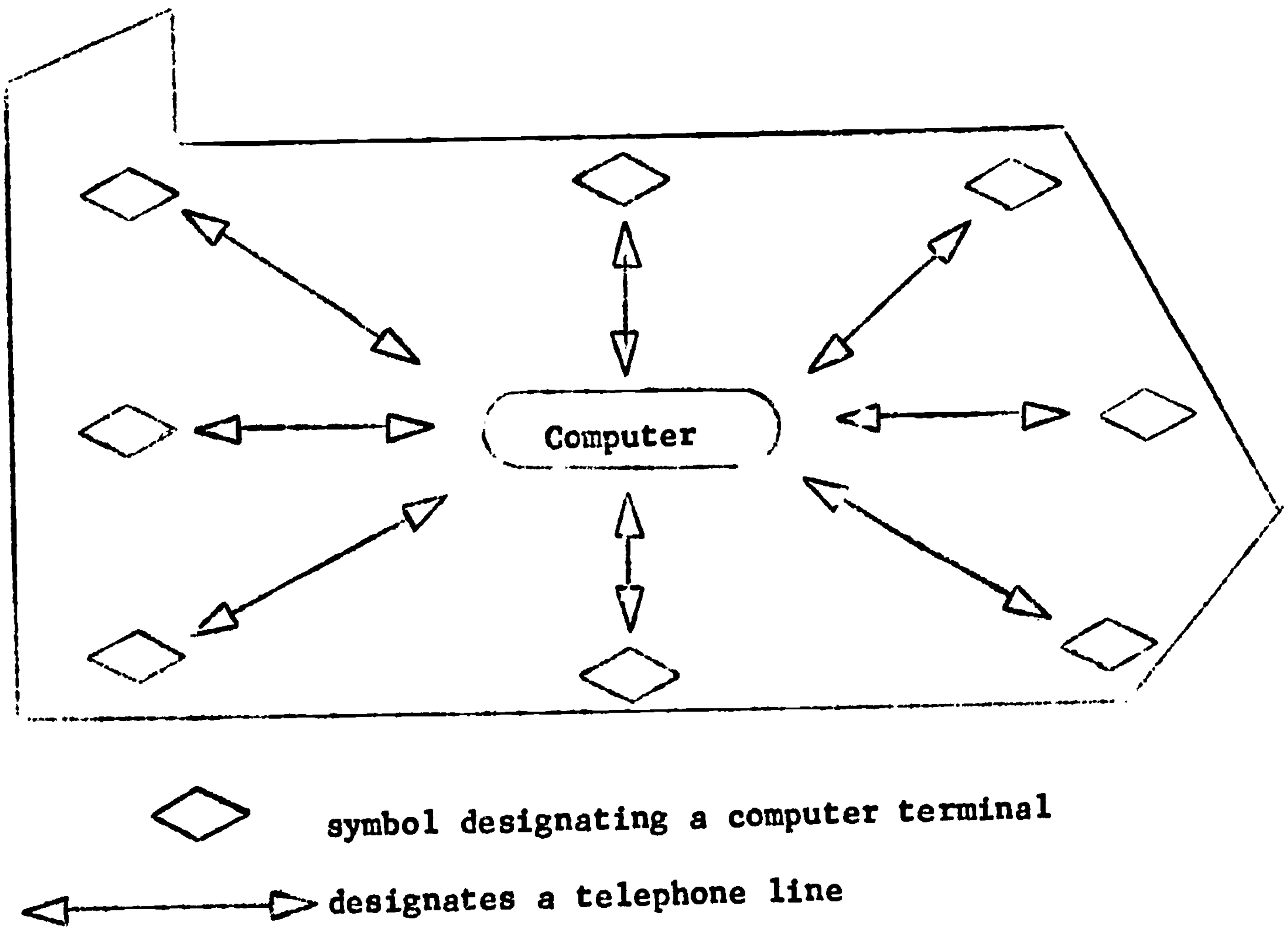
3. If the limited system proves to be a valuable asset in the vocational guidance process, what expansion of the system could be made consequent to June 1968?

   a. Expansion in terms of occupational groupings and specific jobs--occupations in fields other than that of trade and technical occupations in all fields requiring baccalaureate and higher levels of education may be included.

   b. Expansion in terms of numbers and types of pupils for whom the system is designed--the system could be expanded to be used with youngsters in an academic program, or a general program, in school or out of school, in junior high school or senior high school, with adults at all levels of education and training.

c. Expansion in terms of the setting where the system is used--with slight modifications, the system could be utilized not only in schools but in employment service offices, and personnel offices in large industries.

4. In terms of school use, how might the expanded system be operated most efficiently?



The diagram presented above describes a possible organization of a statewide school use of the system. Each school or group of schools who wish to tie into the system, and thereby provide their pupils with the service it provides must rent an IBM 1050 terminal (or more than one), lease telephone lines to the central computer, and pay a designated per hour sum for the use of the computer. Each school will not need its own computer, nor will it be possible to adapt the system, as it

is perfected to less complex models of computers than that for which the system was designed.

The efficiency of such a setup is based on the fact that it is much less costly to maintain one up-to-date source of information than it is to maintain several. Efforts of local school guidance persons may then be expended in other directions more conducive to their interests and abilities, resulting in an improved guidance program.

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VOCATIONAL EDUCATION DEPARTMENT OF THE PENNSYLVANIA STATE UNIVERSITY

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

Final Report

THE DEVELOPMENT AND EVALUATION OF A PILOT COMPUTER-ASSISTED OCCUPATIONAL GUIDANCE PROGRAM

(Project No. 16033, 17033, 18033).

Joseph T. Impellitteri
Principal Investigator

July 31, 1968

VOCATIONAL - INDUSTRIAL EDUCATION **Research Report**

PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION

Bureau of Vocational, Technical
and Continuing Education

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TO: The ERIC Clearinghouse on Vocational and Technical Education
The Ohio State University
980 Kinnear Road
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(Address) Bureau of Research 214 Executive House Pa. Dept. Of Public Instruction
P. O. Box 911, Harrisburg, Pa. 17126

DATE: November 7, 1968

RE: (Author, Title, Publisher, Date) Impellitteri, Joseph T. The Development and Evaluation of a Pilot Computer - Assisted Occupational Guidance Program, Pennsylvania State University, July 1968

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Acknowledgements

Because of the wide scope of activities engaged in during the two and one-half years of this computer-assisted guidance project the principal investigator feels indebted to a number of individuals and agencies whose cooperation and contributions were essential at various points in its progress. The expression of appreciation noted herein is but a small token as compared to their aid and assistance.

Principally the Bureau of Vocational, Technical and Continuing Education of the Pennsylvania Department of Public Instruction is to be commended for its farsightedness in approving substantial financial support for the project. The Computer-Assisted Instruction Laboratory at Penn State with its technical assistanc and cooperation was absolutely essential during the planning and conduct of both the developmental and field trial phases of the project.

Extraordinary mention must be made, too, of the Altoona, Pennsylvania School District where both field trials were conducted. The cooperation extended to the staff within the School District by the Superintendent Dr. Thomas Heslop and by the Director of Guidance and Research Dr. Thomas Long resulted in a smooth and efficient field trial operation. Mr. Carl Luckner of Keith Junior High School and Mr. Richard Gottshall of Roosevelt Junior High School both located in the Altoona School District were each indispensible to the trials conducted within their respective schools. No better assistance, nor higher degree of cooperation could have been expected. Herbert Bolger, Daniel Clark and William Gibbons in the Altoona Area Vocational-Technical School also played key roles in the developmental stages of the project as well as the field trials.

The cooperation of the United States Employment Services, Bureau of Employmen Security was extended in their releasing their General Aptitude Test Battery (GATB to Penn State for its use in the project. The Technical Branch of the Pennsylvani

Bureau of Employment Security was responsible for training project staff in the administration of the GATB as well as advising them as to its appropriate usage. The State College Local Office also cooperated with the staff as to various aspects of the use of the GATB.

During the development stage of the project there arose a need for actual interviews with workers in approximately 85 occupations as well as pictures of these workers on the job. In order to simplify the task for the staff, as well as assuring a wide geographical representation of the workers, the vocational directors in the Central Pennsylvania Region were asked to assist. Their response was completely overwhelming. With their established relationships with various industries in their local areas schedules were arranged so that within a few weeks all interviews were completed and all pictures taken. Special thanks must be extended to the vocational directors for their efforts.

My appreciation goes out to innumerable of my colleagues in the College of Education at Penn State who regardless of other commitments were willing to offer their assistance. Many occasions have arisen within the past 30 months for me to use their special talents and understandings. Their contributions have been considerable.

Finally, to the staff of the project go my many thanks for their continued high level performance and support. Scott I. Kostenbauder, Technical Manager of the project wrote the Coursewriter I Computer programs and supervised the myriad of technical details which arose at each stage of the project. Dr. Edward A. Campbell, coordinator of the project until December 1, 1967, currently at the Ohio State University, was responsible for gathering the occupational information materials, condensing, editing and abstracting them in order to produce the descriptions which appear in the current version of the program. Francis J. Paolone, Lance N. Hodes, Theodore Hill, Jerome T. Kapes and Richard Alfred, graduate assistant with the project all contributed substantially to the success of the

project. Mrs. Marjorie Mazor and Miss Peggy McGrail, project secretaries, have shown the patience and understanding only the project staff can appreciate. Their efforts are to be commended.

In writing this final report the efforts of Mr. Hodes, Mr. Kapes, Mr. Kostenbauder and Mr. Paolone were invaluable. Each of these persons deserve special credit for their untiring efforts under sometimes trying circumstances.

What is reported in this final report is the result of the efforts and co-operation of hundreds of individuals. The effort, though many times frustrating and sometimes even perilous, has been rewarding.

July 30, 1968

Joseph T. Impellitteri, Chairman
Graduate Education and Research
Department of Vocational Education
The Pennsylvania State University
and Principal Investigator

ABSTRACT

Based upon the needs of today's youth to explore the world of work and the increasing importance of vocational guidance in their development, the Computer-Assisted Career Exploration System was developed. The purpose of the system is threefold: to provide an easily updated individualized occupational information retrieval system; to develop through an essentially heuristic approach a process whereby youth could develop their own individualized frameworks of the occupational structure; and to provide an experience for youth to acquire, by simulated practice, operational strategies in relating their abilities and interests to occupational opportunities.

The project was initiated on January 1, 1966 with financial support from the Pennsylvania Department of Public Instruction. In April, 1967 the first phase of the project, the development and debugging of the prototype model was completed. The student terminal provides the means by which a student interacts with the system. The terminal, tied into an IBM 1401 computer by telephone lines, is composed of a typewriter-like device, a tape recorder, and a slide projector, all under computer control.

The computer relates selected materials to the student, who is seated at the terminal, by either typing out a message through the typewriter, displaying a particular image on the slide projector, or by playing a previously recorded message on the tape recorder. The student relates meaningful messages to the computer by typing a short response on the typewriter. This short response required of the student is considered to be essential since longer typed messages would require a level of typing skill not ordinarily achieved by most ninth grade boys.

Information related to a certain students' abilities, preferences and educational plans are stored in the computer before the student begins the interactive phase. The student is oriented to the purposes of the system before he begins the first

session. At that time, he is given a list of 40 occupations with corresponding codes representing his primary entry into the system. The computer's first request to the student is to ask him to select one of the 40 occupations on the list about which he would like to know more. After the student responds by typing an occupational code number, the computer then types out a short paragraph very briefly describing the occupation. The student is then asked if he wishes to find out more about the occupation. If the students responds positively, four operations are activated in the following order: 1) discrepancies which may exist between the student's ability-preference profile and the requirements for the particular occupation are typed out; 2) a two-minute taped interview with a worker in the occupation is played; 3) an image is projected on the slide projector screen depicting the worker undertaking four typical tasks in the occupation and 4) a 150 to 200 word description of the occupation is typed out for the student to read, and to keep for later use.

The student is allowed to proceed through as many occupations as he wishes during as many 40-minute sessions as he wishes. He may, at any point in the process, indicate that he would like the computer to select for him those occupations from the list of 40 which he might be interested in exploring further. The computer, by comparing the aptitude-preference profile for the student with the 40 occupational profiles seeks those occupations for which no discrepancies exist. It lists those occupations for the student.

The system as described was tested in two separate trials in the Altoona, Pennsylvania School District. The first trial, approximately ten weeks in length, was held in the spring of 1967 at Keith Junior High School. The youngsters scheduled for the system experience were 72 ninth grade boys who had indicated that they were interested in selecting a vocational or technical course of study the following year at the senior high school.

The second field trial was conducted at Roosevelt Junior High School involving the scheduling of 140 ninth grade boys between October, 1967 and May 1968. These boys also were selected on the basis of their having indicated a preference for a vocational or technical course of study the following year.

On the basis of the Keith trial, several revisions were made on the system during the summer of 1967. Utilizing the revised system in the Roosevelt trial (N=140 boys), it was found that:

1. The average number of 40-minute sessions the boys scheduled was five.
2. Of the 40 occupational descriptions stored, the youngsters, on the average, chose 16 of them--eleven complete, and five partial.
3. Sixty-five per cent of the boys utilized the opportunity to request the computer to select occupations which they might have pursued further.
4. The boys generally felt that the terminal experience was interesting and valuable.
5. The boys felt that as a result of the experience they were considering more rather than fewer occupations.
6. The boys were generally stimulated to seek out additional occupational information on their own.
7. The typeouts were perceived to be the most helpful and most interesting component of the terminal configuration, the slides least helpful and least interesting.
8. Many of the boys missed the opportunity while in a terminal session to discuss problems which arose.
9. The discrepancy statements were useful in that they appeared to force a boy to examine himself.
10. The boys did not appear to develop any consistent strategy of exploration while working with the system.
11. As compared to a group of similar boys who were not scheduled on the system, the experimental groups stated occupational goals and choice of course of study did not seem to be affected by the experience.
12. Specific items of occupational information can be taught by using the CACE system.
13. The boys generally perceived the system as the best way to explore occupations, second only to on-the-job experience.

Based upon the results of the field trials at Keith and Roosevelt, it may be concluded that the computer-assisted career exploration system is an effective and feasible device in assisting youth to explore occupational opportunities. It also may be concluded that the lack of a sound theoretical foundation in vocational psychology impeded the investigators in drawing any implications of the study with regard to such factors as vocational maturity. It is thereby recommended that future efforts in this area be focused upon a theoretical as well as a problem orientation.

I. BACKGROUND AND OBJECTIVES

Because of the increasing complexity of the work world in which we live and the increased demand for workers with a high degree of skills and technical competence it becomes essential to take a hard look at the guidance program found in our schools. The school counselor is the person whom we rely upon to help our young people understand the world of work and to help them explore their places in it. The great importance of occupational information as a means of aiding the counselor in this task has been acknowledged (Hoyt, 1964; Baer and Roeber, 1964; Hoppock, 1963).

In relying upon the counselor as the primary resource to gather, sort, validate and transmit the tons of literature covering thousands of occupations we are asking counselors to accomplish an impossible task, one that is ill suited to his nature and capabilities. But what other, more effective ways are available to do the job?

Many efforts have been made to provide pupils with occupational information utilizing more effective, more attractive, and novel methods. Kenyon (1952) has reported the results of a community effort in this area using tape recordings of occupational descriptions, requirements for entry into the occupation, and local employment opportunities. Another example of the use of tape recorders in transmitting occupational information is reported by Rundquist (1958). In this latter instance recordings were made of actual workers in occupations answering questions about their jobs.

Closed circuit television has been utilized in Washington County, Maryland in an attempt to convey occupational information to a large number (8000) junior and senior high school pupils (Beachley, 1959). A combination of two methods of presentation, colored slides of fifty local occupations, synchronized with a

taped commentary describing the duties, training, and working description of these occupations has been reported by Meagher (1955).

All of the methods described above have at least one major limitation. That is, the same occupational or career information is presented to all of the pupils involved. Thus, the pupil with low academic ability and potential, and possessing little interest in mathematics and the sciences must submit to a period of boredom when the occupations of surgeon, engineer or research chemist are being described.

The computer-assisted career exploration system has been designed to overcome the limitations of these various methods through selective presentation of the material to individual pupils. It is the result of the refinement and integration of two prior approaches to improve vocational guidance.

The first approach is exemplified by the novel methods of presentation described above. The value of the novel presentation of occupational information to pupils has been thoroughly acknowledged and has consequently been fully utilized in the current system. The refinement of this approach has been attained by capitalizing on the flexibility of the computer system. First, the system is designed to allow a goodly amount of pupil participation in the interactive process. Secondly, not only are colored slides and tape recordings utilized, but also a typed record of the content of the session is obtained to which the pupil may refer at any future time. The third refinement is to permit an unlimited increase in the number of occupational descriptions in computer storage.

The second approach which has contributed to the development of the system was that devised by Hull (1925). At that time Hull reported a "comprehensive system of vocational prognosis" (Hull, 1925). His system involved: (1) the categorization of all occupations into 40 vocational groups or "type aptitudes"; (2) the administration of 30-40 distinct tests which would comprise a "universal battery" to great numbers of workers; (3) the development of 40 regression equations utilizing the test measures as predictors, and success in the 40 occupations as the

criteria; (4) the use of a machine to solve the 40 regression equations for each individual based on his aptitude test scores--" . . . the machine will solve in immediate succession a large number of different equations each yielding a forecast for a different vocational aptitude, all equations being based upon one and the same battery of tests" (Hull, 1925); (5) the individual finally examines his predicted scores on each of the 40 occupations to determine which occupations provide both his least chance of success, and greatest chance of success; (6) "The three or four most promising vocations thus emerging may be given further investigation" (Hull, 1928); and (7) from this information the individual may choose his life's work.

Hull foresaw the difficulties involved in promoting his system in stating, "It scarcely needs to be pointed out that the program of vocational guidance thus briefly sketched is a revolutionary departure from the current development of aptitude testing. This being the case, there will no doubt be considerable inertia and resistance from conservative quarters." (Hull, 1928).

Prophetically, though, he added the following, "But the logic of the situation is certain to triumph in the end. We may look forward with confidence to a day not far distant when some such system as that sketched above will be operating in every large school system. Then, and not until then, will there be possible a genuine vocational guidance for the masses of the people" (Hull, 1928).

Hull's approach was refined in the current system by utilizing current computer advancements, and by dependence upon a less empirical approach to occupational exploration. The use of equations based on test scores to predict success in specific occupations is a desirable goal, but at present is not feasible. The data needed for developing such equations are not available--valid criterion measures of job success, the actual relationship between scores on a variety of interest and personality dimensions and degree of job success, and the relationship between measured aptitudes and job success, for each of the occupations and their groupings.

Over thirty years ago Bingham proposed the importance of the information function of the counselor.

> It is not a function of counseling to decide for what calling a youth shall prepare. That is his own responsibility and his right. It is the counselor's responsibility to place at the young man's disposal the best information available, including the most reliable estimates of future opportunities it is possible to assemble (Bingham, 1934).

Three decades later Hoyt reiterated the same theme.

> It seems to me that the time is here for a rededication to the information function in guidance. Because information has been shown as not sufficient for meeting the counseling and guidance needs of students does not mean that it is not necessary. Because students in high school today are apt to change occupations more than once in their adult life does not mean that there is no need for them to make some specific occupational plans now. Because it takes a great deal of counselor time to keep up to date on occupational and educational information does not mean this function should be abandoned nor greatly neglected. . . Because providing information to students is not exciting does not mean it is not a worthy counselor function. If service to students is to take precedence over satisfaction of status as a counselor need, then this re-emphasis must take place. (Hoyt, 1964).

In accepting the necessity and importance of occupational information, and looking ahead a bit to a time when such information can be effectively stored and utilized, Baer and Roeber have commented:

> Computer technology may have a significant impact on counseling and placement. With the aid of computers, counselors and personnel workers will be able to interpret great quantities of data concerning an individual's aptitudes and interests and other aspects of his background in relation to a wide range of occupational possibilities. Such computers will not take the place of the counselor's judgment in guidance and placement. They will digest, analyze, and array information upon which a proper judgment can be based. (Baer and Roeber, 1964).

Objectives

The objective toward which the efforts of the project were directed were twofold falling into the categories of developmental objectives and research objectives.

1. Developmental Objectives

   a. to develop a pilot occupational information retrieval and transmission system which would stimulate a selected segment of the ninth grade male

population to explore occupations on their own.

b. to structure the occupational information transmission and the procedures by which the information is retrieved in such a way as to develop in the boys who are exposed to the system the acquisition of strategies for career exploration.

c. to develop a guidance support system focusing upon occupational information which would represent an extension of the guidance counselor rather than a stand-alone device.

2. Research Objectives

a. to identify the efforts of the computer terminal-student interaction with respect to the impersonal reactions of the computer terminal.

b. to ascertain the perceptions of the students with regard to the effectiveness of the various components of the terminal equipment--typeouts, tape recordings and slide projections.

c. to measure the effects of the computer-assisted career exploration experience on the students' tentative occupational goals, occupational values, assessments of probable success in a variety of occupations, specific knowledge about occupations, ability to relate self-knowledge to potential occupational opportunities, their general attitude toward the world of work and their perceptions of their place in it.

d. to measure the extent to which the students who worked with the career exploration system were stimulated to explore occupations on their own and acquired strategies for career exploration.

e. to test the effectiveness of various strategies built into the career exploration system.

f. to relate such variables as general intelligence (as measured by GATB G score) and tentative occupational goals to outcomes of the career exploration experience.

The objectives listed here are primarily those perceived by the principal investigator in the early spring of 1965 immediately prior to the submission of a proposal to the Pennsylvania Department of Public Instruction. In keeping with the intent of the proposal and with subsequent contractual arrangements no attempt has been made to redirect the efforts of the project to data. In keeping with the current state of developments in the area of computer-assisted guidance support syst plans are underway for re-direction of efforts as well as reconceptualization of crucial issues. Future work by the project staff in this area will take into consideration the increasing numbers of projects currently in various stages of development which have been initiated since the spring of 1965. Brief descriptions of these other efforts as well as the project herein discussed may be found in the "Third Symposium for Systems Under Development for Vocational Guidance," 1967.

Format of the Report

Generally, three major sections of this report may be found in the following pages: 1) Procedures; 2) Findings; and 3) Conclusions and Recommendations. The section focused upon procedures is broken down into subsections - a. Development of the Computer Program; b. The Occupational Description; c. Development of Measuring Instruments; and d. The Field Trials. In the following section the findings of the field trials are discussed. It is also broken down into a number of sub-sections, each primarily concerned with a portion of the research objectives formulated previously.

The appendices inserted at the back of this report have been sequenced using Roman Numerals. These appendices have been included as a potential source of clarity for the reader. The additional appendices (letter-sequenced) which are referred to in the Table of Contents as separate volumes of this report have not been attached to this volume of the report because they do not directly relate to the material discussed herein. For purposes of ease of handling as

well, it seemed that the publication of separate volumes, each representing the potential interest of a limited segment of the Profession would be desirable.

Any of all of these volumes may be ordered by request to the Principal Investigator, Department of Vocational Education, 250 Chambers Building, The Pennsylvania State University, University Park, Pennsylvania, 16802.

The project also has available for loan to interested individuals A-V materials developed for use during the field trials and additionally a twenty-minute movie professionally produced to provide information about the activities of the project.

There are eighty quadrant slides (a slide with four separate photographs) corresponding to the Occupations listed in Appendix A, which are available pre-loaded in a Kodak Carousel circular slide tray.

Each occupation required seven to fifteen original slides to allow selection of the four most desired. These originals are also available should the original photographs be wanted for copying purposes.

Audio tape recordings of the eighty occupational interviews used are available for copying. These are recorded on two separate reels of 1/4 inch tape. Each interview is two minutes in length edited from actual worker interviews which were fifteen to thirty minutes long.

The movie titled, "Computers, Printouts and Career Possibilities", outlines the process of program development and information collection from the initial stages of the project to the actual on-line operation of the program. The film is a 16-minute black and white sound made in July 1967.

2. PROCEDURES

The Development of the Computer Program

At each stage in the development of the Computer-Assisted Career Exploration (CACE) System a revised version of the computer program* was produced. The original program (CAOG) was completed and tested in late winter, 1966. Each of the subsequent revisions (COG, COI and COP) were based upon the feedback from testing and trials of its predecessor. Before specific details of the programs are presented a brief description of the equipment utilized in developing the CACE system is necessary.

The equipment used is an IBM 1410 computer tied by telephone lines to IBM 1050 type student terminals. A terminal is designed to accommodate only one student at a time and includes a typewriter-like device, a tape recorder, and a slide projector, all under computer control.

The computer communicates to the student by either typing out meaningful messages through the typewriter, displaying a particular image via the slide projector or playing a previously taped message on the tape recorder. The student communicates to the computer by typing a short precoded response on the typewriter. The short student response is deemed to be a necessary feature of this system since longer responses would require at least minimal typing skill. It was anticipated that a significant proportion of the students to use the system would not possess even a minimal typing skill, and thus the flow of communications between the computer and the student would be interrupted.

*All versions of the CACE programs were written in Coursewriter I language developed by IBM.

Information stored in the computer as required by the CACE system is of four types:

1) The computer program itself which controls the sequence of operations.
2) Information about various occupations abstracted from a number of government and commercial publications.
3) A General Aptitude Test Battery (GATB)* profile and a preference profile entered by each student who is using the system.
4) A GATB profile and preference profile characterizing each of the occupations for which information has been stored.

The taped messages are approximately two-minute interviews with workers in each of the selected occupations. These two-minute segments were edited from an original taped interview of from 15 to 30 minutes in length. The worker was encouraged to comment on his duties on the job; how he perceived the differences between his work and the work of others who, although employed in the same occupation, worked for different employers; and other personal reactions to the work.

The purpose of the tapes is to transmit to studentsthe personal reaction of persons in the real world to their work--something that cannot be extracted from reading a three-page occupational description.

The slides displayed to the students (four in each of the selected occupations) picture the worker in his environment and focus on him performing typical tasks in his occupation. The purpose of the slides, similar to that of the tapes, is to enable students to see beyond the impersonal characteristics of occupations by attaching a face and a voice to the job.

The first computer program developed for use in the CACE system was given the title of CAOG. It was a demonstration program consisting of eleven occupations (ten of which were actually used). Its prime function was to serve as a testing

*Validity studies are currently being undertaken by the principal investigator as well as other members of the project staff to uncover the usefulness of GATB in the CACE system. (See Kapes, J. T. in Appendix D, a separate volume of this report.)

program for the development of future operations. CAOG includes ten occupational descriptions, four slides for each of the occupations depicting individuals performing various duties, and a 5-minute interview of a worker in each of the occupations. An additional feature of the pilot program was the opportunity for the student to indicate his particular preferences and future plans. This was done through a series of five questions presented to the student after the introduction. His responses to these questions were stored by the computer. When the student finally selected an occupation from the list of ten, if the requirements of that particular occupation were higher than those indicated by the students initially, a discrepancy statement was typed. The purpose here was to make the student aware of the differences between his qualifications and the requirements of certain occupations.

A further choice of the student was to type the word "none" and allow the computer to select occupations form the list for him. This was accomplished through a matching process which included the students' responses to the preference questions (explained previously) and his scores on the nine areas of the General Aptitude Test Battery (GATB) which were typed into the system before the student began using it. This matching procedure typed out the name of an occupation that had a close relationship to the aptitudes and preferences of the student. He was then able to explore the occupation in detail.

The program in operation for the pilot study at Keith Junior High School was COG. This program consisted of 40 occupations, with one slide for each occupation divided into quadrants enabling four scenes to be included on one slide. It also included 2-minute tape interviews and the other options described in the earlier program. This program was also in use during the early phases of the field trial at Roosevelt Junior High.

Operation of the COG program in the field trials uncovered three undesirable characteristics of the program. The first fault was an inadequate number of

occupational titles supplied to the youngster when the machine was asked to select some occupations correlated with the youngster's preference and aptitude profile.

The second undesirable feature of COG was that when the computer was required to select occupational titles the process of searching required twelve to fifteen minutes. The student during this period could only sit and wait. Either the time requirement had to be reduced or the student given something to do during the time period.

The third change desired was a way to assist students in selecting occupations that are suited to them in terms of the aptitude levels involved. The COG program did type out discrepancies for preferences, but not for aptitudes. The student could be guided to more realistic choices by being aware of differences between the usual requirements for an occupation and the student's own aptitudes.

The first problem was remedied by examination of each occupation and classifying it under more than one answer possibility for a preference question where practical. The carpentry trade may be used as an example. Usually the working conditions in this occupational would be a combination of indoor and outdoor mixed, but some jobs might be totally one or the other. Therefore, an occupation such as this was identified as meeting more than one condition. Such an identification enabled the program to find a match for preference answers many more times than when a single classification was given each occupation.

The time the machine required to process the file for the selection of occupational titles was reduced by optimizing the sequency of instructions in the selection sub-routine. Most student profiles are processed in three minutes or less using the newer program logic.

The third desired change was accomplished by the addition of another sub-routine to the COG program. This sub-routine caused a statement to be printed whenever the usual requirement of an occupation is higher than the specific GATB aptitude score of the student. The workding of the statements is such that only a discrepancy is cited for a specific aptitude and the degree of difference is not stated.

Several examples for illustration of the type of statement used are:

a. "The typical worker in this occupation can understand and use words more effectively than you."

b. "The typical worker in this occupation can work with numbers more quickly and accurately than you."

c. "The typical worker in this occupation is better able than you to work rapidly and accurately with small objects using his fingers."

The COG program with the three described changes was renamed COI to distinguish the two programs while in the computer files simultaneously. After COI was operating properly, it was used with approximately 85 ninth grade boys at Roosevelt Junior High School

The final program was called COP. It had the same format as COI but operated with 40 different occupations, slides and interviews. This enabled the student to choose from a total of 80 occupations, thereby allowing him a broader range of occupations than was previously available.

The Occupational Descriptions Utilized in the System

The demonstration program (CAOG) contained eleven occupations that were randomly selected from the initial list of forty occupations. These forty occupations were used for the COG and COI programs. The criteria for their selection included: 1. occupations were to be vocational or technical in orientation; 2. they should be occupations which do not require a college degree; 3. the occupations must have been listed in the Dictionary of Occupational Titles; 4. they should be suitable for a wide range of aptitudes; 5. occupations which require post-high school technical training were to be well represented; and 6. occupations with good employment outlook for the future were to be included, as well as those with poor employment outlooks; 7. a wide range of required levels of education and training were to be represented; and 8. representation of some of the less common occupations such as glassblower was desirable.

In addition to the forty occupations for the COG and COI programs, 40 more occupations were then prepared on the same basis for COP.

Each occupation was examined as completely as possible using all currently available resources. All information collected was broken down into the following categories:

a. definition of the occupation
b. duties of the occupation
c. training required for entrance into the occupation
d. working conditions
e. salary for a beginner and the range possible
f. advancement opportunities available and means
g. outlook for the future

For those readers interested in a complete listing of occupational information resources utilized by the project staff for each of the COI and COP occupations obtain a copy of Appendix C, a separate volume of this report.

Brief descriptions of each of the 80 occupations in COI and COP were then written by abstracting from the ten to fifteen page descriptions originally compiled. On the average, each of the brief descriptions included in the CACE system are about 150-200 words in length.

After each of the descriptions had been completed it was analyzed in accordance with the Flesch procedure for ascertaining the reading ease of written material (Flesch, 1951). The level of reading ease which was used as a criterion of acceptability for the material was seventh grade level. The descriptions were again revised if their reading ease level was higher than the criterion. (See Appendix A for the complete writeups of all 80 occupational descriptions.) The question of whether or not such a scale is suitable for use with material which is being presented to the student at approximately 200 words per minute rather than the typical page by page presentation remains unanswered. It was felt by the project staff that its use was justified by the need for some measure of readability.

The slides prepared for the program were actual photographs of workers participating in various phases of their occupation. These photos were carefully

selected for their quality and content. They generally included one or two views of the worker in his environment, one view of the workers hands, and one view of the worker using a typical tool.

The interviews were recorded from workers involved in the actual performance of their occupation. Approximately 15-30 minutes of interviews were originally recorded and edited into a final two-minute segment. The interviews came from a wide geographical area throughout the state of Pennsylvania and appeared to be representative of the typical worker in the occupation. (Refer to Appendix A for a complete list of material presented in each interview.)

Development of Measuring Instruments

a. The Occupational Values Inventory. Because of the importance of occupational values in the decision making process asdemonstrated in the research literature the role of values as related to the system developed herein was explored. Following an intensive review of the literature it was decided to develop a measure of occupational values on the findings of a longitudinal study conducted by Gribbons and Lohnes (1965).

The purpose of the OVI was two-fold: 1. to determine to what extent the occupational values profile differed for certain select groups, with implications for the sturcture of the system; and 2. to determine what effect, if any, a student's experience with the system had upon his values profile (Did it remain stable or change?). This latter purpose was deemed crucial to the ultimate decision as to whether or not ninth graders occupational values data could be built into the system as an exploratory variable.

Based on the responses to interview questions asked of a group of eighth grade boys and girls Gribbons and Lohnes categorized the responses into 12 general categories: advancement; demand; geographic location; travel; interest; marriage and family; social service; personal contact; preparation; ability; prestige; salary; satisfaction; and personal goals. Six of these categories were selected

for this study and the two values of interest and satisfaction were combined since they were consistently found to be ranked in high adjacent positions by Gribbons' and Lohnes' sample.

The resulting seven categories were: advancement; demand; interest and satisfaction; preparation and ability; prestige; salary; and personal goals. The objective of the instrument was to measure the relative strengths of these values categories for each of the selected subjects. Given the need for the relative strengths of the values it was decided to construct a forced-choice instrument yielding seven ipsative, non-independent scores. The rational for desiring ipsative scores was that they are felt to be more of a reflection of the realities affecting choices and decisions. That is, given three alternative courses of study, or three alternative schools to attend, or three alternative jobs from which to select, the choice must be narrowed down to one.

Each occupational values category was represented by fifteen different phrases and statements. Triads of phrases and statements were constructed, each triad representing a unique combination of values categories. With seven categories taken three at a time 35 combinations were possible. There are thus 35 items in the OVI.

Within a triad a youngster must choose the most important and least important phrase or statement, and leave one blank. A student's score in a category is the sum of his scores for the 15 statements or phrases representing that categroy. If a phrase or statement is marked "most: it is scored a "2". If it is left blank it is scored a "1". If it is marked "least" it is scored a "0". The highest score that may be attained in any one values category is 30 and the lowest is zero.

Internal consistency reliabilities for each of the categories were calcualted for boys and girls separately, and for the total group as well. The reliabilities, though not independent estimates from category to category, may be assumed to be rather useful estimates of the consistency of the students' responses within a category. These reliabilities are reported in Table I.

Table I

Kuder-Richardson 20 Reliabilities and Rabinowitz-Eikeland* Reliabilities of the OVI for Boys, Girls and Total Group.

	K - R (20)		Rab - Eik		
	Boys (N=110)	Girls (N=110)	Boys (N=110)	Girls (N=110)	Total (N=220)
Interest and Satisfaction	.658	.729	.730	.819	.791
Advancement	.677	.711	.775	.814	.798
Salary	.747	.845	.829	.880	.863
Prestige	.411	.598	.672	.764	.720
Personal Goal	.446	.602	.637	.771	.726
Preparation and Ability	.681	.692	.655	.762	.717
Demand	.582	.476	.721	.704	.717

*An extension of the Hoyt method. (See Rabinowitz-Eikeland, 1964).

Based on the scoring scheme described the Rabinowitz-Eikeland reliabilities are the appropriate estimates. The Kuder-Richardson reliabilities were calculated for the sake of the reader. In order to calculate the KR-20's, however, a different scoring scheme using only half of the available information was constructed. A student's score for each category was the total number of phrases or statements within a category to be marked "most important."

The reliabilities reported refer only to the revised version of the OVI which was utilized with the Roosevelt Junior High School group. The initial version administered to the Keith Junior High School group demonstrated obvious deficiencies which negated the necessity of calculating reliabilities. The inventory was revised during the summer of 1967 in order to correct the observed deficiencies. In reporting the findings of the Keith Junior High School administration of the OVI cautious interpretation is stressed.

b. Occupational Projections Inventory. The Occupational Projections Inventory (OPI) was developed to ascertain what changes occurred in the students thinking regarding their probability of success in occupations, following their experience with the computer terminal. It was felt that exposure to the system would increase the students knowledge of specific occupational requirements and thereby enable them to evaluate their own potential for success in any number of occupational area. The inventory used a 5-point scale of increasing value for each of the 40 original occupations. Hoyt reliabilities for internal consistency were calculated for the OPI during the Keith pilot study. The first reliability coefficient was based on the pre-test only. This included both the experimental and control groups with the number of students involved equal to 108. The reliability (r_{tt}=.795) was based on a 108 students x 40 items design.

The second calculation of reliability (r_{tt}=.826) was based upon the experimental group only (N=72) tested pre and post. This reliability was calculated using a 40 items X pre and post scores X 72 students design.

c. Recation Inventory. The Reaction Inventory (RI) was developed as a measure of student opinions regarding variou-s aspects of equipment, content material, and procedures. It was administered to both student populations (Keith and Roosevelt) following their terminal experience. The findings from the RI are discussed in the following section of this report.

A multiple choice format was used for each of the three areas. Specific questions were asked to elicit student reactions to the project. The information was used to improve the program and its operation.

Questions concerning equipment contered around two areas of inquiry. The first qas the equipment itself, i.e., slides, tapes and the terminal. The staff felt slides and tapes were important aspects of the program and student reaction to this was desired. The second area of inquiry involved the operation of the terminal compared to having a counselor available. Once again student reaction to this was desired.

The second part, content material, looked at the typed out information presented to the students. Student opinions regarding the information itself, its difficulty, the variety, etc. were evaluated and changes made where necessary.

Part three, procedures, related to the operation of the program and the general format followed for each student. The staff was anxious to find out where the students felt improvements could be made.

d. General Knowledge of Occupations Test. The Knowledge Test was developed with the assumption that the amount of knowledge students gained regarding occupational information would provide some measure of the relative success of the program. Although the dissemination of occupational information was not a prime requisite of the project, it was felt this measure would give the staff an indication of the learning that might be taking place.

The purpose of the Knowledge Test was to find out how much junior high students know about certain jobs. A second determination was the effect the system had on the students specific occupational knowledge.

The questions covered several specific categories that were considered important. These categories included: duties, requirements, working conditions, salary, and employment outlook.

A multiple choice format for each of the 40 occupations was developed with a total of 149 questions actually used. The breakdown by categories follows:

	No. of Questions	Categories
	39	Requirements
	35	Duties
	31	Employment Outlook
	27	Working Conditions
	17	Salary
Total	149	

Students were asked to circle one of four possible answers for each question. The correct answers to the questions were taken directly from the material that was presented to them.

The administration of the test and an analysis of the findings are reported in a subsequent chapter.

The Field Trials

The trials for the program were conducted in Altoona, Pennsylvania, a community of some 70,000 people. At one time, Altoona was primarily a railroad town. It has recently made efforts to become more diversified with respect to its industrial make-up. The trials were conducted at two junior high schools in Altoona, Roosevelt and Keith. The pilot study was conducted at Keith in the spring of 1967 while the most recent field trial took place at Roosevelt between September 1967 and May 1968. The two trials were scheduled so that there would be an adequate amount of time between the trials to allow for revisions of the program, revisions of instruments and desirable changes in the sequencing of various activities.

At Keith ninth grade boys who had indicated they would be entering a vocational or technical program the following year at the senior high school volunteered to participate in the initial program. Seventy-six of these boys were actually scheduled for terminal sessions between April and June of 1967 while the remainder (36) were not. Prior to the beginning of the terminal operation, the entire sample of volunteers were administered a series of instruments designed by staff members for this project. The General Aptitude Test Battery was administered at that time as well. The GATB scores attained by the group of 112 boys placed them slightly above the medium of a nationwide sample of ninth graders on each of the nine aptitudes (U. S. Department of Labor, 1966).

This sample of Keith boys as well as the sample utilized at Roosevelt in the following school year were not strangers to remote terminal computer operations. The Altoona School District, as part of its continuing instructional program supports an extensive remote terminal configuration. Each junior high school has a terminal tied into a central computer located at the senior high school for use

In the Keith trial there was always a proctor located in the same room with the terminal equipment (one IBM 1050 terminal). The proctor was a trained guidance counselor who also was knowledgeable about the equipment. The room where the terminal was located was quite large, so the effect of privacy of computer-student interaction was maintained. At the same time the proctor was available in case of student need.

The experimental group spent an average of a little more than two sessions on the system, with each session lasting approximately 40 minutes. The students could select any one of the 40 occupations available to them or they could allow the computer to select occupations for them, a procedure described earlier. The students were interviewed following their experience and their reactions were recorded for further evaluation.

Each of the 76 boys who had been exposed to the Computer-Assisted Career Exploration system were administered the paper-and-pencil reaction inventory described previously. In addition they were readministered the OPI and the OVI. Finally, those items in the knowledge test which related to occupations described to a boy during his terminal sessions he was also asked to re-answer.

The most recent field trail of the CACE system was conducted at Roosevelt Junior High School between September 1967 and May 1968. The trial involved 455 ninth grade students. This total involved 221 girls and 235 boys. The boys were divided into three groups: those who felt that they might enter a vocational or technical course of study the following year at the senior high school and who would be scheduled for CACE terminal sessions; those who were probably vocational program bound, but who were not scheduled for terminal sessions; and those who were not vocational program bound who also were not scheduled for terminal sessions.

In order to determine which boys were to be scheduled for terminal sessions the first step was to ask all the ninth grade boys at Roosevelt whether or not

they were currently planning to enroll in a vocational or technical program the following year. Those who indicated they were not planning to do so (N = 104) made up the third group listed previously. Those who indicated they did plan to enroll in a vocational or technical program the following year were administered the GATB. Of these 140 youngsters 38 were randomly selected to be scheduled for the first six-week segment of terminal useage. Fifty-nine more boys were randomly selected to be scheduled for the second and third six-week segments of the trial. Forty-three boys, the remainder, were scheduled for the fourth segment of six weeks.

Thus, 97 boys were identified as experimental with regard to the trial, and the 43 boys scheduled for the last six-week segment were identified as the control group. Although this latter group eventually did experience the terminal sessions, they did so after the administration of the criterion measures. The mean GATB scores of the Roosevelt group were somewhat higher than those of the Keith group.

Between the third and fourth six-week segment the OVI was administered to all ninth graders at Roosevelt. Each of the students were also asked to state his or her first three tentative occupational goals as well.

At the conclusion of each six week segment the boys who had been scheduled during that segment were interviewed and asked to fill out a Reaction Inventory. The boys scheduled during the fourth six week segment were also asked to retake the OVI.

3. RESULTS AND FINDINGS

DESCRIPTION OF THE SYSTEM

Since the students from Roosevelt who were scheduled for terminal sessions were allowed a great deal of freedom to dictate the amount and nature of the experience, many questions arose regarding the actual uses made of the many aspects of the system.

The first question discussed in this sesion is, "How many 40-minute sessions did the boys choose to spend with the system?" The second question to be focused upon in this section is, "How many occupational descriptions did each boy request?" The final question deals with the use of the "none" option included within the system.

Number of Terminal Sessions. Table 2 reveals that the boys at Roosevelt chose to spend from two to seven complete 40-minute sessions with the computer terminal for an average of 4.5 complete sessions each. Also presented in the same table is the finding that 0.7 partial sessions (those in which computer or terminal breakdowns, or other student commitment) per student were recorded. The partial sessions were scheduled for students as complete sessions. The fact that something happened to terminate the session was a chance occurrence. In reporting the average number of sessions spent by each student, it then appears that "about 5" would be the most justifiable estimate possible.

Table 2

Average Number of 40-Minute Sessions with the System Experienced by Each Group

	Complete Sessions		Partial Sessions	
Group	Range	Mean #	Range	Mean #
I (N=38)	3-7	4.8	1-3	0.7
II (N=20)	2-7	4.5	1-4	0.9
III (N=37)	2-7	4.6	1-3	0.9
IV (N=34)	2-7	4.2	1-2	0.5
TOTAL (N=138)	2-7	4.5	1-4	0.7

Number and Types of Occupational Descriptions Presented. In a previous section of this report, the process by which the interaction between the student and terminal progresses has been explained. It is important here to emphasize two points. First, that at any one time the student seated at the terminal may choose either to receive the complete description of an occupation (the "b-option"), or to receive a very brief abstract of the complete description (the "a-option"). Secondly, a student could request a description of any one occupation in the list of forty many times as he desired to do so.

Since the only primary student entry into the system was the code number of the occupation that he wished to have described, he was given a list of the 40 occupations included in COI numbered one through forty. In the interpretation of much of the data dealing with exploration of the youngsters with the system, the placement of a specific occupation on the list (toward the top of the list, middle or bottom) may have influenced their specific decisions.

In order to investigate this question, each occupation was ranked according to the total number of times it was requested to be described by the total sample of boys. Mechanical draftsman, placed first on the list, was chosen the most times (98 requests) by the students. However, the second-ranked occupation (95 requests) was automobile mechanic which had been placed as number 25 on the list. The occupation placed 18th on the list, IBM Machine Operator, ranked third with 93 requests. Painter and paperhanger were chosen least by the group with only 24 requests. It was placed 27th on the list. Additional analysis of the rankings did not support the contention that placement on the list increased or decreased the chances for a particular occupational description to be requested. It is interesting that an enticing occupation such as commercial airline pilot placed ninth on the list, ranked 12.5.

Of the 2,247 descriptions that were requested by the total sample of 138 boys, 30 per cent were for the brief description only ("a-portion), and 70 per cent were

for the complete description ("b-option"). When categorized by level of GATB G-Score (high, average or low), only those boys with low G scores tended not to coincide with the overall 30 per cent/70 per cent breakdown. The low G scorers tended to request the complete descriptions about 80 per cent of the time.

The average number of occupational descriptions requested by each of the boys was approximately 16. This number includes both a-option and b-option as well as repeated descriptions of the same occupation. When this data was analyzed for high G scores, average G scorers, and low G scorers, no substantial differences were noted. Boys in each group explored approximately 16 occupations on the average.

When the student selects the "none" option on the system, he is, in effect, requesting the computer to list those occupations among the forty stored that he might be interested in exploring. Only in groups 3 and 4 of the Roosevelt trial was the choice of this option encouraged. Although informed as to the purpose of the option, only 52 of the 81 boys in these groups chose to select the option. For those selecting the option, an average of over 3 occupations were listed for each individual. Of the three occupations listed, the boys on the average requested descriptions of only two of them.

Reaction of Students to the Terminal Experience.

The results reported in this section refer to the initial computer program developed (COG) used at Keith Junior High School and the revised version (COI) tried out at Roosevelt Junior High School. Since there were substantial differences in the two trial situations as well as in the two versions of the program, a comparison of results from group to group has been made.

With regard to both this between group comparison and the within group comparison, it was not deemed appropriate to formulate and test hypotheses. The need for empirical data and its current companion respectability has not been felt during the conduct of this project nor is it deemed desirable at this

*All responses to the Reaction Inventory for both the Roosevelt and Keith groups may be found in Appendix I of this report.

point of development. The exploratory efforts undertaken herein have been conducted with a view toward generating hypotheses rather than testing them. The data presented in this section of the report has been confounded a good deal by the "Hawthorne effect". The precision needed to control this experimental contaminent would justify hypothesis testing. The field trials in Altoona were not subject to such rigid controls, and hence only descriptive data is reported.

Four sub-sections are found in this portion of the report--Reactions to Equipment, Reaction to Content Material, Reaction to Procedures and Summary. Much of the data reported in this section of the report is expanded upon in the following section dealing with the student interview data.

Reactions to Equipment. In both the Roosevelt (R) group (N = 136) and the Keith (K) group (N = 75) only three per cent of the boys felt that working with the computer system was boring. Over 70 per cent of the boys in each group indicated that they felt the experience was "definitely interesting." About 80 per cent of the boys in each group felt that the equipment they worked with definitely aided them in understanding more about work. They also indicated that working with the computer system was a good way to learn about occupations ("definitely good" - R, 80 per cent; K, 70 per cent). Although the computer system was perceived by at least 90 per cent of both groups as helping them to understand the occupational information presented, 20 per cent more of the Keith sample than the Roosevelt sample (77 per cent - 57 per cent) felt it was "definitely an aid."

Over 80 per cent of both groups indicated that learning to use the terminal equipment was a simple task, and that they were given adequate time to learn its use. Related to this finding is the reaction by over 60 per cent of both groups that they were at least "slightly tense" in their first session at the terminal. In their last session, however, only 16 per cent of the Keith sample and four per cent of the Roosevelt sample felt even "slightly tense."

Approximately 25 per cent of both groups indicated that they would have preferred at least slightly more control of the terminal system. About 60 per cent of both groups felt that they were given enough control of the terminal system. Over 70 per cent of both samples indicated that they felt they were kept active enough when working at the terminal. Personal observations of the students seated at the terminal by the project staff shed some doubt on the accuracy of this result. Additional comments about degree of student activity are presented in the following section.

One of the more interesting comparison of responses between the Keith sample and the Roosevelt sample is found when analyzing the responses to questions #14 and #15 in the first subsection of the Reaction Inventory. Question #14 asks, "Which way of presenting information about jobs was most helpful to you?" Question #15 asks, "Which way of presenting information about jobs was least helpful to you?" The three alternative choices to each question are: 1. TYPE OUT ON SHEETS; 2. SLIDES; and 3. TAPE RECORDING.

Of the Keith sample utilizing the initial version of the program (COG) 71 per cent indicated they felt the typeouts were most helpful, 14 per cent felt that the slides were most helpful and the remaining 15 per cent felt the tape recordings were most helpful. The corresponding choices of the Roosevelt sample were typeouts (51 per cent), slides (10 per cent) and tape recordings (38 per cent). When compared to the Keith sample, 20 per cent fewer of the Roosevelt group felt that the typeouts were most helpful, and 23 per cent more of the same group felt that the tape recordings were most helpful. Although the majority of the boys in both trials found the typeouts to be most helpful, the overwhelming choice of the typeouts to the exclusion of the slides and tape recordings as found at Keith was not corroborated at Roosevelt.

When asked which aspect of the system was least helpful the Keith group responded to the same three alternatives in the following manner: typeouts,

12 per cent; slides, 55 per cent; and tape recordings, 32 per cent. The corresponding results of the Roosevelt boys was: typeouts, 15 per cent; slides, 66 per cent; and tape recordings, 16 per cent. Since no attempt was made to revise the tape recordings between the first and the second field trail there appears to be no obvious cause for the higher level of acceptability of the recordings in the Roosevelt group. The fact that both groups generally perceived that machine breakdowns (including tape recorder) were not a serious problem appears to eliminate that factor as a contributing casue of the difference. The more time allotted to the boys in the Roosevelt trail, the increased attention given to planning of the second trial, or the increased focus given to orientation of the Roosevelt boys may have all contributed to the tape recordings better fitting into their total perceived picture. Further explanation of this aspect is offered in the next section of the report when interviews with the youngsters are discussed.

Generally, most of the youngsters felt that the typeouts gave the most information and had the additional value of enabling the boys to refer to them at a later time. The primary objections to the slides was that they were "inadequate" and "not original." Although the slides were actually pictures of real workers in an occupation they were perceived as "phony" by the youngsters. The lack of action was the major source of inadequacy of the slides according to the youngsters. Another inadequacy as phrased by a number of boys was that the slides didn't tell enough, "You just saw the picture of the occupation--may be it required a college degree, and the slides didn't tell you that much."

Reactions to Content Material. Over 70 per cent of both groups felt that there was an adequate amount of information presented about each occupation. Over 80 per cent of the boys within both groups felt that the variety of information, although adequate was not sufficiently detailed. Over 90 per cent of both groups indicated that the occupational information presented was interesting as well as valuable. In keeping with the Flesch scale reading analysis (see "Procedures" section) over 90 per cent of both groups felt the material was easy to understand.

The boys in both groups generally felt that the occupational information presented to them via the computer terminal was superior to other types of occupational information to which they've been exposed (K, 81 per cent; R, 84 per cent). Sixty-eight per cent of the boys in the Keith sample and 74 per cent of the boys in the Roosevelt sample felt that the information would "definitely" be of use to them. Over 75 per cent of both groups indicated that they were able to give more attention to the occupational information presented via the terminal than to other means of presenting occupational information to which they'd been exposed.

There were three items included within this sub-part of the Reaction Inventory which attempt to get at the effects of the terminal experience on the students. They are: 1. "Did the computer-based material encourage you to explore occupations on your own?" 2. "Do you think that the occupational information helped you to relate your knowledge about yourself to the characteristics of the various occupations?" and 3. "As a result of the occupational information you've received, are you considering more or fewer possible occupational choices than before?

Over 75 per cent of both groups indicated that they were encouraged by the experience to explore occupations on their own. Eighty per cent of the boys in the Keith sample and 90 per cent of the boys in the Roosevelt sample felt that the occupational information presented helped them to relate their knowledge of themselves to a variety of occupations. Slightly less than 70 per cent of the boys in both groups indicated that as a result of the experience they were considering more occupations than they had previously. About 25 per cent of the boys in both samples were considering fewer possible occupational choices.

Since the responses to these latter three items are rather crucial in determining some measure of the effectiveness of the system an additional analysis of the data was undertaken. For the Roosevelt group only (selected on the basis of the larger sample size) the boys were separated in three sub-groups on the basis of their

BATB G scores: 1. high intelligence; 2. average intelligence; and 3. low intelligence. It was suspected that the responses reflected differences in intelligence level rather than differences in reactions to the system. The chi-square test of independence was run between the intelligence variable and each of the response variables independently. The three chi-squares obtained were non-significant at the .05 level. The data thus does not support the contention that response to the three items discussed previously are dependent upon intelligence level.

In the first section of the Reaction Inventory the boys were asked to indicate which way of presenting information was most and least helpful to them. In Part II of the inventory they were asked which source of information was most and least helpful. The responses to these latter two items corroborate the findings discussed previously in this section. Of the boys in the Keith sample 77 per cent indicated that the typeout was most helpful, twelve per cent felt the slides were most helpful and twelve per cent preferred the tape recordings. Corresponding percentages of the Roosevelt sample to the item were: 52 per cent for typeouts; eight per cent for slides; and 40 per cent for tape recordings. The Roosevelt sample indicated that the source of information that was least helpful was; typeouts, twelve per cent; slides, 75 per cent; and tape recordings, 13 per cent. The "least helpful" responses of the Keith sample were: typeouts, six per cent; slides, 56 per cent; and tape recordings, 38 per cent. Again the higher degree of acceptability of the tape recordings in the Roosevlet group is obvious.

By utilizing the chi-square test of independence (intelligence level by category of response to "most helpful" and "least helpful" items) it was determined that there was no evidence in the data to indicate the responses to these items were dependent upon intelligence level.

Reactions to Procedures. Boys in both groups generally agreed that the typeouts as well as being most helpful in making a future occupational choice (60 per cent of K and 50 per cent of R) are probably the most enjoyable (25 per cent of K

and R) of the three elements of the system. They also agreed that the slides were the least helpful (45 per cent of K and R) and least enjoyable (25 per cent of K and R) aspect of the system. The attitudes of both groups toward the tape recordings fell somewhere between the extremes of desirability represented by the typeouts on the one hand, and the slides on the other. The tape recordings represented a more helpful and more interesting source of information for the Roosevelt group than for the Keith group. This finding is consistent throughout the discussion in this section of the report and the following section as well.

When asked it they missed the opportunity to discuss problems during their sessions with the computer, 49 per cent of the Keith boys indicated that they did, 29 per cent felt they didn't and the remainder had no opinion. Fifty-seven per cent of the Roosevelt boys missed the opportunity for discussion of problems, 27 per cent did not and the remainder had no opinion. Thus, about twice as many boys generally felt the need for discussion of problems during the sessions with the terminal than didn't.

Exactly 87 per cent of both the Keith and Roosevelt boys felt that if given a choice they would favor obtaining occupational information by way of the computer terminal than any other means. Over 90 per cent of both groups felt satisfied with what they had learned as compared to the effort they had put into the experience. More than 60 per cent of both groups indicated that they would have preferred sessions that were over an hour in length. During both trials the sessions were held to 40 minutes each.

Generally, both groups of youngsters felt that the sequence in which the descriptions of the occupations were presented was typical (85 per cent of K, and 93 per cent of R). Over 75 per cent of the boys in both groups felt that they had an adequate amount of time to think about the occupational information as it was presented.

revealed the following:

1. They perceived the terminal system as providing an interesting as well as a useful and valuable way to learn about occupations.
2. When compared to other ways of learning about occupations to which they have been exposed, the terminal system is greatly preferred.
3. As a result of their experience on the system they: were stimulated to explore occupations on their own; were considering more rather than fewer occupational choices; and were better able to relate their abilities, values and interests to occupations.
4. A major portion of the boys missed the opportunity to discuss problems in their sessions with the terminal.
5. They felt the equipment was easy to operate and the material presented was easy to understand.
6. Although most of the boys were at least slightly tense during their first terminal session, almost all of the boys were relaxed during their final terminal session.
7. Although a majority of both groups felt they had enough control in the terminal sessions, a substantial portion of the boys desired greater control.
8. The occupational information presented was generally felt to be adequate in terms of amount and variety, as well as being presented in a logical manner.
9. Most boys from both Keith and Roosevelt felt that they were kept active enough in the terminal sessions as well as being given enough time to think between the stages of the sequence.
10. They indicated that they had few equipment breakdowns.
11. They would have preferred sessions of at least an hour, rather than the 40 minute sessions allowed.

12. The computer typeouts were perceived by both samples of boys to be the most enjoyable, helpful and beneficial component of the terminal configuration.
13. The slides were perceived to be the least enjoyable and least valuable component of the system.
14. The tape recordings were perceived to be somewhat interesting and valuable to the Roosevelt group and of little or no value to the Keith group.

Analysis of Interview Data Concerning On-terminal Experiences

The source of data utilized in this portion of the report is the personal interview conducted with the students subsequent to their experience with the system. These reactions were recorded during interview sessions held within a week after a student had indicated his desire to end his explorations with the terminal. In Group I the interviews were conducted with several (2-5) subjects in attendance at the same time. With Group II the procedure was altered so that only one or two students were present during each interview. With both Groups I and II, as with Groups III and IV, the same interviewer conducted each and every session and in the same room. No attempt was made to conceal the fact that the interviews were being recorded. In addition, the interview was conducted in as unstructured a manner as was possible under the circumstances. In this context a format was established (i.e. similar or identical questions asked of each participant under informal and somewhat uniform conditions) which hopefully created a fairly standardized interview environment.

Because the interview technique was being "debugged" during the sessions with Groups I and II, the responses from the students in these groups is not reported. Also, as mentioned in an earlier section, the students in Groups I and II used an earlier version of the Computer Program (COI) during their sessions with the terminal. For these reasons the data from Groups III and IV was considered to be more valid and reliable and hence more valuable. Consequently, only these two groups are used as the sample in all but one of the following descriptive analyses.

Ex Post Facto Comments on Expectations. When the students were asked what they had expected or had hoped to gain from their experiences with this system, the hindsight responses could be put into five categories. These categories are indicated in Table 3 along with the percentages from both groups giving each response.

Table 3

The Expectations of Boys in Groups III and IV from the Terminal Experience, by Percentages

Response Category	Group III (N=38)	Group IV (N=42)	Total (N=80)
a. To learn about or get better idea of the kinds of jobs available	37	24	30
b. To see which jobs would be of interest or would "fit"	23	24	24
c. To find out about a particular job	11	14	13
d. To "see" how a computer works	13	10	11
e. No expressed reason	16	28	22

No attempt will be made at this time to discuss the differences between the groups in comments (a) and (e) from Table 3 other than to remark in passing that perhaps the everyday school encounters among the participants helped to foster familiarity with jobs among those in Group IV prior to their own experiences with the system.

Two quotes seem to reflect the feeling among the students with respect to their ex post facto expectations. One student stated that he wanted "to see what kinds of jobs there are in life and see what kinds of occupations you could take beside most occupations you find around town"; the other expressed comment was that the student wished to find out "what I would be able to do".

Changes in Awareness of Self and Work. A ninth grader's self-perception of cognitive changes taken place can be more elusive than with his self-perceptions of affective changes. Thus, it appears with these students' expressions of overt or

covert changes within themselves. The participants seemed more able to express the more affective matters (likes and dislikes) than the cognitive changes, if any. However, of those able to express a cognitive percept 10 out of 42 (24 per cent) of Group IV and 20 out of 38 (52.5 per cent) of Group III were able to state that they were now thinking more about the world of work, more aware of self, and more concerned with job explorations. The combined total shows that 30 out of 80 (37.5 per cent) were either more "aware" or more articulate in expressing their perceptions. One student's comment was that he "got a better idea of what I had to do on a job". Another stated that he did not think that the world of work was "as big as it is . . ." and that there's, "more you can pick from".

The expressions of affective or interest changes were more lucid. The students seemed more able to communicate an expansion or a narrowing of interests toward potential occupational opportunities or high school curricula. Table 4 demonstrates these changes.

Table 4

Expressed Interest Changes Toward Occupations or School Courses of Study by Boys in Groups III and IV, by Percentages

Type of Expressed Interest Change	Group III (N=38)	Group IV (N=42)	Total (N=80)
An Expressed Change	68	88	79
a. Expanded Interests	26	38	37
b. Narrowed Interests	37	33	30
c. Changed specific interests toward occupation or curriculum	5	17	12
An Expression of "No Change"	7	5	5
No Expression of any change	25	7	17

A cross check was made on the expressed change interests (expanded or narrowed only) with the written response to the same question checked on the paper-and-pencil

Reaction Inventory. It was found that no boys from Group III and only two boys from Group IV who in the interview stated an expansion of interests actually had indicated a narrowing of interests on the Reaction Inventory. Of those boys who expressed a narrowing of interests in the interview, however, eleven of 14 boys in Group III (78.5 per cent) had actually indicated on the Reaction Inventory that their interests had expanded. Likewise, 8 out of 14 in Group IV (57 per cent) indicated a similar disagreement. Combined, this shows a whopping 68 per cent (19 out of 29) who verbally stated that their interests had narrowed yet had previously checked that their interests had expanded on the Reaction Inventory given just prior to the interview.

The discrepancy may be due to an attempt to modify or overcome a conflict within these particular vocational or technical bound students. They are forced to designate a choice in a high school course of study involving training for a relatively specific occupational area while in the ninth grade. Yet, these same students may feel that their interests are just beginning to be awakened. This feeling may be typified by one student's comment when he said, "I think I look at jobs a different way (now). You get more information about it and you change some ideas you had about it". In the same vein, another student insightfully said that "when you get older your ideas change and you want different things to do". This situational conflict for ninth graders is discussed by Super in his article "The Critical Ninth Grade: Vocational Choice or Vocational Exploration." (See Super, 1960.)

Suggested Changes in Content, Procedure, and/or Hardware. Along with changes in self, the interviewees proposed certain particular modifications in the hardware and software. Those in Group IV were predominantly more vocal in their suggested changes. Thirty-six out of 42 boys (87 per cent) in Group IV saw need for change, whereas only 12 of 38 boys in Group III, 32 per cent, did so. Since the suggestions were many and varied, they are simply itemized in Table 5.

Table 5

Suggested Changes in Content, Procedure and/or Hardware by Boys in Groups III and IV

Suggested Changes in Content

1. Include a greater variety of occupational descriptions.
2. Include more information about each occupation.
3. When slides are shown explanatory comments should accompany them.
4. Tape recordings of workers in occupations should include more than one worker in an occupation.

Suggested Changes in Procedures

1. Lengthier orientation to system must be arranged.
2. Students must have greater control of the interaction.
3. Sessions with terminal should be longer than 40 minutes.

Suggested Changes in Hardware

1. Slides should be replaced by movies.

Occupational Explorations. On the basis of the interview responses an attempt was made to categorize the students' strategy (if any) of exploration. Because of the nature of the responses, the overlapping categories, and the multiplicative as well as the complicative factors involved in any exploration strategy, the "reasons" given for the "method" of exploration are simply listed in hierarchical order of frequency of response:

1. Explored jobs on basis of interests and likes.
2. Explored jobs on basis of previous knowledge or experience with what others have said about the jobs.
3. Explored on basis of awareness of abilities.

This ranking holds for both groups individually and collectively with the third ranked reason far behind the others. As might be expected, the predominant response was that the students did not have or were not consciously aware of any definite strategy on their part during their explorations.

However, a particular interview question elicited a categorical response which could be tabulated. The question had to do with the discrepancy information presented

to the student. As will be recalled by the reader the purpose of the discrepancy statements was to point out differences between a student's stated preference and measured abilities and the requirements of certain occupations.

Group IV was the only group for which complete data was available. Of the boys in Group IV: 69 per cent had noted and considered the discrepancy statements printed out to them; 24 per cent had noted, but not really considered the statements; and seven per cent had not even noted the discrepancy information. The extent and nature of the effect of this information upon the students is not entirely clear. However, some comments made by the students indicate certain cognitive and affective reactions. Several students stated that the discrepancy information prompted them to talk to others or investigated other sources for more information to find out why and whether or not they "can't do this or can't do that". Other students felt that this discrepancy information helps to understand oneself. . . "sort of helped me decide on different things". One student who noted the discrepancy information thought about it overnight and then changed an answer to one of the "Preference Questions."

On the other hand, two comments which typify the indifferent attitudes are that the discrepancy information "didn't bother me too much. . .because if you try hard enough you can make it", and it didn't make any difference since "I'm still in ninth grade and I have three more years to go through, and if I wanted that job. . . I'd work on it (the deficiency)".

Students Stimulated to Seek Additional Information. As mentioned earlier in this section, some students were motivated to seek more information from the school counselor. The counselor kept a record of these contacts for the participants in Groups I, II, and III. No data records were kept for those in Group IV. The only indication that boys in the latter group attempted to see a counselor was a verbal comment given during their interview sessions. Nine boys in Group IV stated that they went to see a counselor. The breakdown in the first 3 groups is found in Table 6.

Table 6

Boys in Groups I, II and III Stimulated to Further Occupational Explorations

	Number	Percentages
Group I (N=38)	16	42
Group II (N=20)	5	25
Group III (N=38)	4	10
Total (N=96)	25	26

Although "only" one-fourth of the students manifested their motivation to see a counselor as a result of the terminal experience (no data available on boys in Group IV) comments recorded in the interview sessions indicated that many boys sought out other sources of information, outside the school. Moreover, although 70 per cent of the boys in Groups I, II, and III were from the average or slower sections at Roosevelt 90 per cent of the 25 boys motivated to further explorations were enrolled in the average or slower sections.

A Final Note. The interviewer, when asking the students their opinions as to the best way for them to learn about or explore occupations, presented four alternatives for the students to pick from (not in any particular order): 1. reading about jobs in books and pamphlets, 2. talking to others on the job, 3. on-the-job itself, and 4. the experience with the computer-assisted career exploration system. The most frequently picked alternative was on-the-job experience, with the computer experience a close second. Talking to others on the job and reading were further back but equally close to each other. Perhaps two comments can best sum up the opinions of the boys as expressed in their choices of alternatives above: 1. other

ways "would take you probably hours to look up mostly everything you do with the computer in 20 minutes", and 2. "I thought about it (the job), what I'd feel like in the occupation while (going through the program). I actually put myself where that man was".

Tentative Occupational Choices.

In the latter part of September, 1967 when the boys who were to take part in the field trial were being identified, some additional data was gathered. Each of the ninth grade boys attending Roosevelt Junior High School were asked to list their first, second and third tentative occupational goals. The data was collected by the vocational guidance counselor who went from room to room. He passed out a 3 X 5 index card on which each boy placed his name, section number, whether he intended or did not intend to select a vocational or technical course of study in tenth grade, and the three choices as requested.

This data provided the pre-treatment information related to tentative occupational choices against which the post-treatment data collected in early March, 1968 was compared. Each ninth grade boy was asked at this later time to again list his first, second and third tentative occupational goals. Each of the analyses reported in this section involved: 90 to 100 vocational or technical bound boys who had experienced the computer interaction; 35 to 40 vocational or technical bound boys who served as a control; and 90 to 95 boys who had not indicated a preference to enter a vocational or technical program when passed to tenth grade.

The rationale for setting up the design in this manner was to eliminate the confounding of the vocational-bound vs non-vocational bound variable. To allow all the vocational or technical bound youngsters an opportunity to work with COI, the control group of approximately 40 boys was scheduled for the terminal experience between the time this data was collected and early May, 1968.

The changes in tentative occupational choices between September and March were examined with respect to five variables:

1. differences in the number of choices indicated (although asked to list three choices most boys indicated only one or two, some none). The reason for the differing N's from analysis to analysis has been caused by the nature of the analysis. In some cases a certain response in September negates the usefulness of the comparison of pre vs post.
2. differences in field (according to Roe's classification) of the first choice as indicated in September and again in March.
3. differences in level (according to Roe's classification) of the first choice as indicated in September and again in March.
4. differences in the degree of specificity of the first occupational choice between September and March.
5. whether or not the same first choice was indicated in September and again in March (stability of first choice).

One additonal non-change variable was examined in order to more clearly differentiate the groups--the number of post choices.

Two orthogonal comparisons of each of the six valables listed previously were run. The first involved a comparison of the vocational or technical bound boys as compared with the non-vocational bound boys. The second involved a comparison of the two groups within the vocational or technical bound classification--those who had experienced the treatment and those who had not. The non-parametric statistic chi-square was utilized to test the twelve resulting hypothesis.

H_1: The change in the number of occupational choices listed between September and March was the same for both the vocational bound and non-vocational bound groups. (Rejected at the .05 level of significance--obtained $x^2 = 12.89$)

Table 7

Chi-square Expectancies of
Vocational and Non-Vocational Groups
by Changes in Number of Occupational Choices

	GROUP						
	VOC			NON VOC			
Change	fo	fe	(x^2)	fo	fe	(x^2)	TOTAL
Fewer in March	9	17.9	(4.4)	22	13.1	(6.1)	31
Same in March	53	51.4	(0.1)	36	37.6	(0.1)	89
More in March	64	56.6	(1.0)	34	41.4	(1.3)	98
TOTAL	126			92			218

Table 7 demonstrates that the major contributing factors in obtaining the significant chi-square of 12.89 were that fewer vocational bound boys than expected indicated a lower number of choices in March than in September, and more non-vocational bound boys than expected listed fewer choices in March.

H_2: The change in the number of occupational choices listed between September and March was the same for both the treatment and control vocational bound boys. (Failed to reject at the .05 level of significance--obtained $x^2 = 0.15$.)

H_3: Vocational bound boys were as likely as non-vocational bound boys to change the field of their first occupational choice between September and March. (Failed to reject at the .05 level of significance--obtained $x^2 = 0.07$.)

H_4: Those vocational bound boys who experienced the treatment were as likely as the vocational bound boys who did not change to the field of their first occupational choice between September and March. (Failed to reject at the .05 level of significance--obtained $x^2 = 0.96$.)

H_5: Vocational bound boys were as likely as non-vocational bound boys to change the level of their first occupational choice between September and March. (Rejected at the .05 level of significance--obtained $x^2 = 9.10$.)

Table 8

Chi-square Expectancies of Vocational and Non-Vocational Groups by Differences in Levels of First Occupational Choices

	GROUP						
	VOC			NON-VOC			TOTAL
Changes in Level	fo	fe*	(x^2)	fo	fe*	(x^2)	
Higher in March	22		(0.4)	10		(0.7)	32
Lower in March	13	20.9	(3.0)	22	14.1	(4.4)	35
No change	101		(0.3)	60		(0.4)	161
TOTAL	136			92			228

*Not all fe's are reported--only those associated with x^2 values above 1.

From Table 8 it may be readily observed that fewer vocational bound students than expected and more non-vocational bound students than expected listed a first tentative occupational choice in March that was at a lower level than one he had listed in September.

H_6: The vocational bound experimental group were as likely as the vocational bound control group to change the level of their first occupational choice between September and March. (Failed to reject the .05 level of significance--obtained $x^2 = 4.81$.)

H_7: Vocational bound boys were as likely as non-vocational bound boys to change the level of specificity of their first occupational choice between September and March. (Rejected at the .05 level of significance--obtained $x^2 = 11.76$.)

Table 9

Chi-square Expectancies of Vocational and Non-Vocational Groups by Differences in Level of Specificity of First Occupational Choices

	Group						
	VOC			NON-VOC			TOTAL
Level of Specificity	fo	fe*	(x^2)	fo	fe*	(x^2)	
More specific in March	30		(0.0)	19		(0.0)	49
Less specific in March	31	22.1	(3.6)	6	14.9	(5.3)	37
No change	75	84.7	(1.)	67	57.3	(1.6)	142
TOTAL	136			92			228

*Not all fe's are reported--only those associated with x^2 values greater than 1.

Table 9 reveals that more vocational-bound students than expected and fewer non-vocational bound students than expected were less specific in March than in September. These factors obviously contribute most to the significant chi-square obtained. They outweigh any of the other aspects of the expectancy table.

H_8: The vocational-bound experimental group was as likely as the vocational-bound control groups to change the level of specificity of their first occupational choice between September and March. (Failed to reject at the .05 level of significance--obtained x^2 = 3.36.)

H_9: Vocational-bound boys were as likely as non-vocational-bound boys to indicate the identical first occupational choice in March as they did in September. (Failed to reject at the .05 level of significance--obtained x^2 = 0.36.)

H_{10}: Vocational-bound experimental boys were as likely as the vocational-bound control boys to indicate the identical first occupational choice in March as they did in September. (Failed to reject at the 0.5 level of significance--obtained x^2 = 2.10.)

H_{11}: The number of occupational choices listed by the vocational-bound group in March was no different than the number of choices listed by the non-vocational-bound group at that time. (Rejected at the .05 level of significance--obtained x^2 = 11.45.)

Table 10

Chi-square Expectancies of Vocational and Non-Vocational Groups by Number of Occupational Choices Listed in March.

	GROUP						
	VOC			NON-VOC			
Number of Choices	fo	fe*	(x^2)	fo	fe*	(x^2)	TOTAL
0	5		(0.0)	3		(0.0)	8
1	14	19.1	(1.3)	19	13.9	(1.8)	33
2	34	41.0	(1.2)	37	30.0	(1.7)	71
3	73	61.3	(2.2)	33	44.7	(3.1)	106
TOTAL	126			92			218

*Not all fe's are reported--only those associated with x^2 values greater than 1.

As is clearly indicated in Table 10 the vocational-bound youngsters are more likely to list more tentative occupational choices than the non-vocational bound boys. They are, as well, less likely to list few choices than the non-vocational bound boys.

H_{12}: The number of occupational choices listed by the experimental group of vocational-bound boys in March was no different than the number of choices listed by the control group at that time. (Failed to reject at the .05 level of significance--obtained $x^2 = 1.88$.)

It may be concluded at this point that any differences which exist in the data with regard to tentative occupational choices are a reflection of the vocational-bound vs non-vocational-bound comparison rather than the treatments by control comparison within the vocational-bound category. The differences which do exist may be summarized as follows:

1. The non-vocational-bound boys were more likely than the vocational-bound boys to reduce the number of tentative occupational choices listed between September and March.
2. The non-vocational-bound boys were more likely than the vocational-bound boys to list their first occupational choice in March that was at a lower level than their first choice they indicated in September.
3. It was more likely for the non-vocational bound group than the vocational-bound group that the first occupational choices indicated in March were more specific than those they indicated in September.
4. The vocational-bound students indicated more occupational choices in September than the non-vocational bound group.

Since each of the six hypotheses involving the comparison of the experimental and control sub-groups within the vocational-bound group were found to be tenable it was decided to investigate this group further. The total group (N = 136 responding upon specific variable analyzed) was broken down into three subgroups

based upon the students' GATB G-score. The resulting distrubution found 55 boys in the "High" category, 43 in the "Average" category and 38 in the "Low" category. These groupings were consistent with the GATB profile structure established for use on the COG system as explained previously.

Six hypotheses were tested utilizing the chi-square test of independence. From the results of these tests it is apparent that within the vocational-bound group the level of a boy's GATB G-score is independent of: 1. the change in number of occupational choices he listed between September and March; 2. whether or not he indicated a change in occupational fields in that period; 3. whether or not the level of this first occupational choice would change between September and March; 4. whether or not his first occupational choice as stated in March would be more or less specific than that which he stated in September; 5. whether or not he indicated the same choice in March as he had in September; and 6. whether he would indicate no occupational choices, one, two or three in March.

Selection of Tenth Grade Course of Study

One of the possible effects of the terminal system experience upon the ninth grade vocational-bound youngsters who took part in the field trial at Roosevelt Junior High School was selection of their course of study for the following year. The choice of course of study was examined because it represents the resultant of innumerable factors interwoven into this choice process. The advantage of focusing upon choice of course of study is that this variable is easily and accuratley measured. The disadvantage lies in the indefinite meaning of results. That is to say, if no actual difference exists between a predetermined expected choice and observed choice, can it then be assumed that the variability among the various factors which make up the complex composite have also been identified? One's concept of self, his value system, his appreciation of the alternatives, his assignments of various risks and consequences to each alternative each may vary in any direction. The resultant of all these changes, however, may be a predictable

choice of course of study. Thus, predictability of choice of study cannot infer an accompanying explanation of the process by which the choice is made.

With this rationale in mind it was decided to compare the course of study selections of the ninth grade boys enrolled in Roosevelt Junior High School and compare these choices with those made by ninth grade boys in previous years at Roosevelt. Since the number of ninth grade boys enrolled at Roosevelt Junior High School has remained constant during the past decade, comparisons of actual numbers of boys making certain choices would be preferable to percentage comparisons.

Table II presents the numbers of boys choosing each of the vocational and technical courses of study, as well as the total number of boys selecting the vocational-technical sequence rather than the academic, business or general courses of study. Two questions were investigated here: 1. Did the total number of 1968 boys choosing a vocational or technical course of study differ from the total number of 1965 or 1967 boys choosing a vocational or technical course of study? and 2. among the four groups of boys listed in Table II choosing a vocational or technical course of study, were there differences in how many chose a specific course of study? The answers to both questions is obviously, "no." The total number of boys selecting a vocational or technical course of study at Roosevelt was 154 in 1965, 160 in 1967 and 163 in 1968. Assuming an approximate total of about 250 boys enrolled in the ninth grade at Roosevelt since 1960 there is no difference. Glancing from column to column across each row it is obvious that no practical differences exist either between years, or between the specific groups in the 1968 class.

Analysis of Occupational Values Inventory (OVI).

The Occupational Values Inventory (OVI) described in a previous section of this report was administered to the ninth grade boys at Keith Junior High School a pre-post treatment basis in March of 1967 and again in May of 1967. All ninth graders

Table II

Numbers of Roosevelt Ninth Grade Boys Selecting Vocational or Technical Course of Study: 1965, 1967, and 1968

Vocational or Technical Course of Study	1965		1967		1968 Treatment		1968 Non-Treatment	
	#	%	#	%	#	%	#	%
Auto Shop	21	13.6	15	9.4	7	9.1	8	9.2
Auto Shop II	20	12.9	14	8.8	7	9.1	9	10.3
Cabinet and Mill	16	10.4	16	10.0	6	7.9	1	1.1
Electric Shop	12	6.3	10	6.3	5	6.6	4	4.6
Electronic Tech.	21	12.0	19	11.9	7	9.1	10	11.5
Machine Shop II	9	4.4	7	4.4	4	5.3	4	4.6
Mech. Drafting	17	17.1	27	16.9	14	18.4	23	26.4
Plumbing Shop	4	1.2	2	13.0	2	2.6	1	1.1
Printing Shop	5	3.8	6	3.8	1	1.3	2	2.3
Sheet Metal Shop	1	0.6	1	0.6	-	---	-	---
Trowel Trades Shop	7	9.4	15	9.4	1	1.3	3	3.4
Computer Programming Tech.	16	13.3	21	13.1	11	14.5	20	23.0
Welding Shop II	5	3.2	5	3.1	4	5.3	--	----
Carpentry	-	---	-	---	5	6.6	2	2.3
Home Appliance	-	---	2	1.3	2	2.6	--	---
TOTALS	154	100%	160	100%	76	100%	87	100%

enrolled at Roosevelt Junior High School during the academic year 1967-68, boys and girls, vocational and non-vocational bound students, were administered a revised version of the OVI in March, 1968. A selected group of vocational-bound experimental boys (n = 40) were re-administered the OVI at the completion of their sessions with the computer terminal.

The results of the OVI are discussed in three sub-sections: 1. the Keith Junior High School results utilizing the initial version of the OVI; 2. a comparison of the scores of four groups of Roosevelt Junior High School students on the seven categories of the OVI; and 3. differences in the scores on the seven OVI categories for a selected group of vocational-bound ninth grade boys before and after experience with the terminal system.

Keith Junior High School Analysis. In March, 1967 and again in May, 1967-68 ninth grade boys attending Keith Junior High School were administered the original version of the OVI. The first administration was immediately prior to the youngsters' experience with the terminal system and the second administration was immediately following the experience.

The range of scores possible for each of the values categories was -15 to +15. The 15 phrases or statements in a certain category were scored +1 if it were marked "most important," -1 if it were marked "least important" and zero if it were left blank.

The profile of mean scores for each of the categories, both pre and post are presented in Table 12. From the table it may be seen that there were some changes between the pre-test means and the post-test means within a values category.

The raw scores for each values category were transformed into standard scores with a mean of 50 and a standard deviation of 10. The standard scores for 61 boys on both the pre-test and post-test for each of the seven values categorized were analyzed in a seven by two by 61 analysis of variance design (values categories x change, pre to post x students).

Table 12

Pre-Test and Post-Test Means of the Seven Values Categories for the Keith Group

Values Category	Pre-test Mean	Post-test Mean
Interest and Satisfaction	1.85	2.16
Advancement	0.94	1.48
Salary	-0.74	-2.48
Prestige	-4.23	-5.31
Personal Goal	2.75	2.90
Preparation and Ability	4.68	4.32
Demand	-0.90	-2.35

The analysis of variance results indicated that there were no significant main effects nor interactions in the data. The fact that there were changes from pre-test mean to post-test mean as observed in Table 12 may be of some practical value.

Roosevelt: A Comparison of the OVI Category Scores Between Girls, Vocational-Bound Experimental Boys, Vocational-Bound Control Boys, and Non-Vocational Bound Boys. The procedure utilized in analyzing the seven mean scores of the four groups was to perform a one-way analysis of variance for each of the categories independently. The between groups variation with three degrees of freedom was compared to the within group variation with 451 degreees of freedom. If the resulting F-ratio was significant, the three degrees of freedom between groups was utilized to make some orthogonal comparisons. Table 13 presents the general breakdowns of the techniques.

Table 14 indicates the mean scores of the four groups on each of the seven OVI categories. The possible range of scores utilizing the scoring scheme discussed in a previous section was 0 - 15. From the table it is obvious that similarities

Table 13

General Analysis of Variance
Procedure for Analyzing the OVI Data

Source of Variation	df	SS	MS
Between Groups	3		
a. Girls/Boys	1		
b. Voc. Boys/Other Boys	1		
c. Voc. Exp. Boys/Voc. Control Boys	1		
Within Groups	451		
TOTAL	454		

are the rule rather than the exception. When differences in means occur in a values category the differences appear to be, with one exception primarily between girls and boys.

Table 14

Mean Scores of the Four Groups
on the Seven Categories of the OVI

	GROUP			
OVI CATEGORY	Exp. Voc. Boys (N=90)	Con. Voc. Boys (N=40)	Other Boys (N=104)	Girls (N=221)
Interest and Satisfaction	6.28	6.03	7.25	7.69
Advancement	5.63	5.85	5.37	4.59
Salary	3.82	3.80	3.64	2.58
Prestige	2.59	2.50	2.37	2.81
Personal Goal	6.73	7.20	6.62	7.63
Preparation and Ability	6.91	6.58	7.13	7.38
Demand	3.03	3.03	2.68	2.34

<u>(a) Interest and Satisfaction</u>. The hypothesis that the means of the four groups were representative of the same population mean was rejected at the .05

level of significance ($F = 8.58$ with df $_{3,451}$). The orthogonal breakdown indicated that: the means of the girls (7.69) as compared to the mean of the boys (6.67) were not representative of the same population mean ($F = 16.62$ with df $_{1,451}$); the mean of the vocational-bound boys (6.20) was not representative of the same population mean as the mean of non-vocational bound (7.25) boys ($F = 8.86$ with df$_{1,451}$); and the mean of the vocational-bound experimental boys (after terminal session experience) came from the same population mean as the mean of the vocational-bound control boys (with no terminal experience).

(b) Advancement. The hypothesis that the means of the four groups were representative of the same population mean was rejected at the .05 level of significance ($F = 4.56$ with df $_{3,451}$). The orthogonal breakdown indicated that: the mean of the girls (4.59) as compared to the mean of the boys (5.55) were not representative of the same population mean ($F = 12.73$ with df $_{1,451}$); each of the other two hypothesis failed to be rejected ($F = 0.79$, $F = 0.16$ with df$_{1,451}$).

(c) Salary. The hypothesis that the means of the four groups were representative of the same population mean was rejected at the .05 level of significance ($F = 5.92$ with df $_{3,451}$). The orthogonal breakdown indicated that: the mean of the girls (2.58) was not representative of the same population mean as the mean of the boys (3.74), ($F = 17.54$ with df $_{1,451}$); the other remaining hypothesis failed to be rejected at the .05 level of significance ($F = 0$ in both cases).

(d) Prestige. The hypothesis that the mean of the four groups were representative of the same population mean could not be rejected at the .05 level of significance ($F = 1.29$ with df $_{3,451}$).

(e) Personal Goal. The hypothesis that the mean of the four groups were representative of the same population mean was rejected at the .05 level of significance ($F = 5.06$ with df $_{3,451}$). The orthogonal breakdown revealed that:

the mean of the girls (7.63) and the mean of the boys (6.76) were not representative of the same population mean ($F = 13.52$ with df $_{1,451}$); neither of the remaining two hypothesis could be rejected ($F = 0.62$, $F = 0.94$ with df $_{1,451}$).

(f) Preparation and Ability. The hypothesis that the mean of the four groups were representative of the same population mean could not be rejected at the .05 level of significance ($F = 1.17$ with df $_{3,451}$).

(g) Demand. The hypothesis that the four group means were representative of the same population mean was rejected at the .05 level of significance ($F = 3.28$ with df $_{3,451}$). The orthogonal breakdown revealed that: the mean of the girls (2.34) and the mean of the boys (2.88) were not representative of the same population mean; the remaining two hypothesis failed to be rejected ($F = 1.73$, $F = 0.0$ with df $_{1,451}$).

Roosevelt: Analysis of category scores on the OVI for a selected group of vocational-bound boys. In the previous discussion of OVI results reference is made to a group called "the vocational-bound control boys." At the time the data was collected for the analysis conducted above the descriptor "control" was accurate. However, immediately following the first administration of the OVI as analyzed in the previous sub-section the 40 ninth grade vocational-bound boys called "control group" were allowed to work with the terminal system. At the conclusion of these voluntary sessions with the system these boys were re-administered the OVI to determine what, if any, changes in scores resulted.

A t-test for correlated samples was utilized to analyze the changes in the seven scores between the initial administration and the second administration. The time elapsed between the two administrations was approximately 6-8 weeks. Because eleven of the 40 boys were not present for the second administration of the OVI data in the following analyses are based on only 29 boys.

The pre-test means and the post-test means for each of the seven occupational values categories are presented in Table 15.

Table 15

Pre-Test and Post-Test Means for
a Sample of 29 Vocational-Bound Boys

	Mean	
Values Category	Pre-test	Post-test
Interest and Satisfaction	6.21*	7.48*
Advancement	6.07*	4.31*
Salary	3.90*	2.52*
Prestige	2.31	2.48
Personal Goal	7.07	6.97
Preparation and Ability	6.52*	7.76*
Demand	2.93	3.41

*Difference significant at the .05 level

The hypotheses that the pre-test and post-test means of the Interest and Satisfication, Advancement, Salary, and Preparation and Ability values were representative of the same population means were all rejected (t = 2.42, t = 2.87, t = 3.11, t = 2.17). The remaining three hypothese failed to be rejected (t = 0.36, t = 0.19, t = 1.14).

Each of the significant directional changes identified above were directed toward the mean profile of the girls as seen in Table 14. For this group of 29 boys; interest and satisfaction became more important. The implication of this finding is discussed in the next section.

Results of the OPI at Keith.

Based on the scoring scheme described in the section of this paper dealing with the development of instruments, two analyses of the OPI data were conducted.

The first analysis was run on the scores of 108 ninth grade vocational bound boys at Keith Junior High School in order to determine the internal consistency reliability of the instrument. The Hoyt reliability for the OPI was observed to be .795. On the basis of this finding it was decided to re-administer the OPI to the 72 boys who were working with the COG terminal system at the conclusion of their experience in order to measure possible changes in the OPI score which could be attributed to the experience.

The findings of the analysis of variance conducted to investigate changes in OPI score between March 1967 and May 1967 are presented in Table 16. The F-rations for the "items" and "Students" sources of variation are not reported in the table since they are meaningless.

Table 16

Analysis of Variance of
Pre-Test and Post-Test OPI
Scores for 72 Keith Vocational-Bound Boys

Source of Variation	df	ss	MS	f
Items	39	636.40	16.32	
Change (Pre/Post)	1	21.92	21.92	5.36*
Students	71	918.17	12.93	
Interaction, I X C	39	54.06	1.39	1.57*
Interaction, I X S	2769	6,227.80	2.25	2.55*
Interaction, C X S	71	290.28	4.09	4.63*
Residual	2769	2,444.74	0.88	
TOTAL	5759	10,593.37		

*Significant at the .05 level.

The main effect of change was found to be significant. In calculating the pre-test OPI mean score for the group and the post-test OPI mean score for the group the

difference between the means was found to be practically meaningless (Pre = 2.56, Post = 2.67). A Hoyt reliability was recalculated for this data according to the formula:

$$r_{tt} = \frac{MS\ students - MS_{I \times S}}{MS_{students}}$$

The reliability was found to be .826. Although it is generally agreed that criterion measures should be highly reliable in order to increase the precision of the experimental analysis a danger seems to be inherent in that position. The chance of finding statistical significance where only small differences in means are present is likely to occur.

General Knowledge of Occupations.

As was previously mentioned, one of the four instruments used to measure the effects of exposure to the system on the student was the General Knowledge of Occupation test. This approach was selected because the material presented by the system can best be described as occupational information. Although the project staff does not view the system primarily as a device for dispensing occupational information, it was still considered important to study the gain in occupational information that might result from exposure to the system.

The development of the General Knowledge of Occupation Test is described in the section of this report on Development. The administration of this instrument was restricted to 110 students in the Keith Junior High School sample. The test was not administered to the Roosevelt Junior High School sample because reaction from the Keith sample indicated that the students felt burdened by the amount of test and questions they were required to complete. In order to reduce the number of testing hours required, this test was dropped for the Roosevelt sample. It is hoped that the results obtained on the General Knowledge of Occupation test with the Keith sample will provide some insight into this area of inquiry.

The results obtained from the General Knowedge of Occupation Test are presented in Table 17. The categories of information refered to are: Requirements on Education and Training (R), Employment Outlook or Advancement (E), Duties (D), Working Conditions (W) and Salary or Wages (S) and the average total (T). The first row of numbers refer to the percentage of correct responses given by the 110 students who took the entire pre-test consisting of 40 occupations. In the entire test there were 39 items dealing with (R), 31 with (E), 35 with (D), 27 with (W) and 17 with (S). In all there were 149 items scored for each of the 110 students.

Table 17

The Percentage of Correct Responses for the Five Knowledge Categories and Total

	CATEGORIES					
	R(%)	E(%)	D(%)	W(%)	S(%)	Ave. Total(%)
Pre-Total Test Student N = 110	33.5	35.1	50.4	46.6	33.4	39.8
Pre-Matched to Post Student N = 60	40.8	48.1	51.4	55.0	37.1	46.4
Post-on Occupations Explored on the System	54.6	53.8	62.4	61.5	42.4	55.9
Difference Post-Pre	+13.8	+5.7	+11.0	+6.5	+5.3	+9.5

After the students had been exposed to the system they were again asked to take the test on those occupations which they explored while on the system. The second row in the table are the percentage of correct responses in the pre-test for those occupations actually explored by those students on the system. Of the 100 students who took the pre-test, 69 were exposed to the system. The third row in the table are the percentage of correct responses on the post-test. The last row in the

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table represents the differnce in the per cent of correct response between the pre-test and post-test. While the percentages given for the total pre-test are based on the 149 items scored for all 40 occupations, it is important to note that the percentages obtained for the matched Pre-Post sample are based on just a few items for each student in each category.

Because of the small sample of item responses in each category the following results were not statistically treated but are presented here in a descriptive form.

1. Comparing the total pre-test percentages with the pre-test percentages for those occupations actually explored on the system (row one with row two) it can be seen that those occupations which the students chose to explore on the system were also those on which higher knowledge scores were obtained. This may indicate that students chose occupations, even for exploration purposes, which they already knew relatively more about.
2. Comparing the matched Pre and Post test percentages (rows two and three) it appears that there is a gain in occupational knowledge for given occupations as a result of exposure to the system. The amount of increase can be seen by looking at the different pre-post percentages (row four). In evaluating the size of the difference in correct responses after exposure to the system it is important to note that each item is of the multiple choice variety with four distractors. Therefore, 25 per cent correct responses can be obtained by guessing alone and the gain indicated represents a bigger proportion of knowledge increase than might be at first apparent.
3. Comparing each of the five categories in respect to increase in correct response (difference pre-post, row four) it can be seen that Requirements on Education and Training (R) and Duties (D) increased considerably more than the other three categories. These results may indicate the type of information to which the students are more likely to attend.

4. Comparing the Salary category (column S) with the other four categories, it appears that the students tested were least able to answer questions about salary both before and after exposure to the system.

5. Comparing the two categories Duties and Working Conditions (column D and W) with the other three categories, it appears that the students tested were best able to answer questions in these two areas both before and after exposure to the system. This result along with that which is described in number four may indicate those areas which are of most and least concern to the sample tested.

The careful observer may be able to find additional information provided in the table which may appear noteworthy. However, the project staff again wishes to indicate its feelings that due to the small sample and experimental nature of the instrument used, no firm conclusions can be drawn at this time.

CONCLUSIONS AND RECOMMENDATIONS

There is an important distinction to be made in summarizing the results of the study reported in this paper. A vast amount of data collected in the interview sessions as well as with the paper-and-pencil reaction inventory represent the perception of students-self-reports regarding their feelings toward thoughts about or reactions to their terminal experiences. To go beyond the student perception level to the level of actual behavioral or attitudinal change necessitates the focus on other sources of data. The self-report data, if taken alone, would be vastly misleading, for it only accounts for a portion of the total picture.

The remaining portion, that which deals with directly observed phenomena (statement of pre-post tentative occupational choices, actual numbers of boys to inquire as to additional information about occupations, the ability of the boys to verbalize an exploratory stratagem) provides for a somewhat different interpretation. The author attempts to maintain the distinction within this concluding section, however, lest some overlap occur, the reader is forewarned.

The students involved in both field trials conducted in Altoona, Pennsylvania reacted very favorably to the terminal experience. The impersonal nature of the interaction did not appear to present any problem. In fact, many of the boys indicated that they felt that the privacy created was more to their liking. At least one-half of the boys taking part in the trials indicated though that they did miss the opportunity to discuss problems. Some ideal mix of terminal experience and counselor involvement in the total process appears to be indicated here.

Much of the data collected in the interview as well as through the administration of the Reaction Inventory is pertinent only to the particular system described in this report. The limited generalizability of much of this data argues against interpreting it as if it applied to other systems, circumstances and students.

The obvious discrepancy in the students' reaction toward the typeouts of descriptions as opposed to the other components of the terminal configuration may be of more general applicability.

Although the boys taking part in the field trials indicated that they generally felt they were considering more rather than fewer occupations as a result of the terminal experience, the data on tentative occupational choice does not support this conclusion. On the basis of the findings of the Knowledge Test, the boys were more likely to select occupational descriptions for those occupations with which they were more familiar. It would seem that the contention that a broadening of occupational opportunities took place is highly unlikely.

The terminal experience also had little or no effect on the boys' choices of tenth grade course of study, ability to relate their abilities and interest to the world of work, their stated tentative occupational goals, or their ability to explore occupations according to a conscious strategy. Though the experience did result in their increased knowledge about selected occupations, the usefulness of the newly acquired knowledge appeared to be lost. The important role of occupational information in the vocational guidance process should go far beyond the information itself at the ninth grade level. The inability of the boys taking part in the field trials to integrate the information acquired into a useful framework appears to shed some doubt on the effectiveness of the Computer-Assisted Career Exploration System.

The finding that 26 per cent of the boys in the Roosevelt trial were stimulated to search for more information seems to be encouraging. Many youngsters implied in the interview that though they did not request more information from the school counselor, they went to other sources outside the school environment for information. The 26 per cent figure then is definitely a minimum. The question remains as to what percentage of the group would have actively sought information if they had not been exposed to the terminal experience.

It would seem that two general conclusions may be drawn. First, it appears that the computer-assisted career exploration system is perceived as useful, helpful and enjoyable by the students for whom it was designed. The terminal equipment, as a medium of communication, was perceived as an effective instrument of communication.

The second conclusion is that the computer-assisted career exploration system has not promoted observable behavior or attitude changes in the students who had an opportunity to work with it. Whether or not such changes are desirable has not been adequately dealt with during the course of this project. It has been assumed that changes, if observed, would be at least indicative of an effect other than as perceived by the students themselves. Such effects could then be related to some theoretical framework in the vocational development literature.

This project has been based upon the firm conviction that the future of computer-assisted guidance support systems is in their value as guidance tools rather than as independent self-supporting entities. Just as strong a conviction has been adhered to in carving out a place for these systems for the future.

The purpose of the project staff from its inception has been to uncover evidence regarding the effectiveness of this approach in the guidance program. Future efforts are planned with a vastly revised system. The revisions to be used commencing Winter, 1969 are based upon many of the observations made by the project staff during the field trials at Altoona. It is expected that by the conclusion of the next field trial, there will be other operational efforts of a similar kind against which results may be compared.

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Appendix I

RESULTS OF REACTION INVENTORY

PART I - Reactions to Equipment

1. Was the computer an aid or an obstacle to you in understanding the occupational information presented?

Keith (N=69)		Roosevelt (N=136)
77.0	Definitely an Aid	57.3
19.0	Somewhat of an Aid	31.6
1.5	Little Aid	3.6
0.0	Definitely an Obstacle	0.0
1.5	Somewhat of an Obstacle	3.6
0.0	Little bit of an Obstacle	.7
1.5	No Opinion	2.9

2. Did you have enough time at the beginning of your work with the computer to learn how to use it?

Keith		Roosevelt
33.0	Definitely Yes	60.2
39.0	Somewhat Yes	27.9
11.5	Slightly Yes	4.1
1.5	Definitely No	3.6
6.0	Somewhat No	5.8
4.5	Slightly No	2.9
4.5	No Opinion	1.5

3. Do you think that more or less time is needed to learn how to use the computer?

Keith		Roosevelt
20.5	Definitely More Time	9.5
19.0	Somewhat More Time	22.0
38.0	Little More Time	41.2
0.0	Definitely Less Time	3.6
6.0	Somewhat Less Time	5.8
6.0	Little Less Time	7.4
10.0	No Opinion	10.3

4. Was it easy or hard for you to learn how to use the computer?

Keith		Roosevelt
30.5	Definitely Easy	44.9
45.0	Somewhat Easy	41.9
10.0	Little Bit Easy	4.4
1.5	Definitely Hard	0.0
3.0	Somewhat Hard	1.5
7.0	Little Bit Hard	7.4
3.0	No Opinion	0.0

5. At the beginning of your work with the computer were you relaxed or tense when working with it?

Keith		Roosevelt
4.5	Definitely Relaxed	11.8
11.5	Somewhat Relaxed	25.0
8.5	Slightly Relaxed	10.3
23.0	Definitely Tense	4.4
19.0	Somewhat Tense	20.6
32.0	Slightly Tense	27.2
1.5	No Opinion	.7

6. During your last session with the computer were you relaxed or tense while working with it?

Keith		Roosevelt
40.5	Definitely Relaxed	86.0
27.5	Somewhat Relaxed	6.6
16.0	Slightly Relaxed	3.6
3.0	Definitely Tense	.7
4.5	Somewhat Tense	.7
8.5	Slightly Tense	2.2
0.0	No Opinion	0.0

7. Do you feel that you were kept active enough when working with the computer?

Keith		Roosevelt
26.0	Definitely Active	40.4
27.5	Somewhat Active	33.0
19.0	Slightly Active	11.8
0.0	Definitely Passive	4.4
6.0	Somewhat Passive	2.9
11.5	Slightly Passive	4.1
10.0	No Opinion	2.2

8. Do you feel that you should have had more control while in the sessions with the computer?

Keith		Roosevelt
12.0	Definitely Yes	20.6
22.0	Somewhat Yes	23.5
20.0	Slightly Yes	16.2
13.5	Definitely No	8.1
6.0	Somewhat No	11.0
4.5	Slightly No	5.9
22.0	No Opinion	15.0

9. Do you feel that there were limitations in using this computer?

Keith		Roosevelt
19.0	Definitely Yes	24.3
20.0	Somewhat Yes	19.1
19.0	Slightly Yes	20.6
11.5	Definitely No	11.8
3.0	Somewhat No	10.3
3.0	Slightly No	2.9
24.5	No Opinion	11.0

ADDITIONAL EXPLANATION:

6.0	Time	4.4
0.0	Breakdowns	.7
0.0	Poor Recordings	0.0
0.0	Poor Slides	0.0
74.0	No Explanation	66.1
6.0	Other	2.2
8.0	Job Descriptions	8.1
6.0	Not Categorized	18.4

10. Do you think that this type of equipment is valuable or worthless in helping you to understand more about jobs?

Keith		Roosevelt
79.0	Definitely Valuable	83.1
12.0	Somewhat Valuable	12.5
1.5	Slightly Valuable	2.2
0.0	Definitely Worthless	0.0
1.5	Somewhat Worthless	0.0
1.5	Slightly Worthless	1.5
4.5	No Opinion	.7

ADDITIONAL EXPLANATION:

41.0	Gave Good Description	39.7
16.0	More Detailed Information than Other Sources	16.9
3.0	Information Obtained More Easily Than by Reading or Asking	8.8
1.5	Typeout Left Permanent Record	.7
38.0	No Explanation	33.8

11. Do you think that working with the computer was interesting or dull?

Keith		Roosevelt
72.5	Definitely Interesting	73.5
23.0	Somewhat Interesting	20.6
1.5	Slightly Interesting	2.2
1.5	Definitely Dull	0.0
0.0	Somewhat Dull	.7
1.5	Slightly Dull	2.2
0.0	No Opinion	.7

12. Overall, do you think that working with the computer is a good or bad way to learn about occupations?

Keith		Roosevelt
69.5	Definitely Good	80.1
19.0	Somewhat Good	16.2
3.0	Slightly Good	1.5
0.0	Definitely Bad	0.0
1.5	Somewhat Bad	0.0
1.5	Slightly Bad	.7
6.0	No Opinion	1.5

13. How often did you meet up with machine errors or breakdowns?

Keith		Roosevelt
8.5	Very Often	6.6
16.0	Fairly Often	29.4
58.0	Seldom	53.7
13.0	Never	10.3
4.5	No Opinion	0.0

14. Which way of presenting information about jobs was most helpful to you?

Keith		Roosevelt
71.0	Typeouts on Sheets	51.0
14.0	Slides	10.3
15.0	Tape Recordings	38.2

ADDITIONAL EXPLANATION:

40.0	Typeout Gave the Most Information and Could Be Kept for Later Reading	33.8
13.0	Slides Showed What Job Was Like	10.3
11.5	Interview with Experienced Men Useful	25.7
35.5	No Explanation	23.5

15. Which way of presenting information about jobs was least helpful to you?

Keith		Roosevelt
12.0	Typeout on Sheets	14.8
55.5	Slides	65.6
32.0	Tape Recording	15.6

ADDITIONAL EXPLANATION:

6.0	Not Enough Information on Typeout	11.0
36.0	Slides Not Original or Inadequate	47.8
14.5	Tape Recording Distorted	1.5
3.0	Tape Recording a Rehash of Other Information	2.9
3.0	Tape Recording Not Really Instructive	7.4
32.0	No Explanation	25.0
6.0	All Ways of Presentation Were Useful	4.4

PART II - Reactions to Content Material

1. How would you rate the information presented to you in comparison to other kinds of occupational information to which you have been exposed?

1. (Continued)

Keith		Roosevelt
37.5	Definitely Superior	30.9
35.0	Somewhat Superior	41.2
8.5	Slightly Superior	11.8
0.0	Definitely Inferior	.7
0.0	Somewhat Inferior	0.0
0.0	Slightly Inferior	2.2
19.0	No Opinion	13.2

2. What is your opinion as to the information itself?

Keith		Roosevelt
58.0	Definitely Valuable	62.5
35.0	Somewhat Valuable	32.4
7.0	Slightly Valuable	2.9
0.0	Definitely Worthless	0.0
0.0	Somewhat Worthless	0.0
0.0	Slightly Worthless	.7
0.0	No Opinion	1.5

3. What is your opinion as to the information itself?

Keith		Roosevelt
47.5	Definitely Interesting	56.6
32.0	Somewhat Interesting	33.8
11.5	Slightly Interesting	5.1
0.0	Definitely Dull	.7
0.0	Somewhat Dull	0.0
3.0	Slightly Dull	0.0
6.0	No Opinion	3.7

4. Was the information easy or difficult to understand?

Keith		Roosevelt
53.5	Definitely Easy	63.2
30.5	Somewhat Easy	29.4
7.0	Slightly Easy	3.7
0.0	Definitely Difficult	0.0
1.5	Somewhat Difficult	0.0
4.5	Slightly Difficult	2.9
3.0	No Opinion	.7

5. Do you feel that the information about the occupations was too general or too detailed?

Keith		Roosevelt
16.0	Definitely General	25.0
22.0	Somewhat General	23.5
13.0	Slightly General	10.3
16.0	Definitely Detailed	5.1
8.5	Somewhat Detailed	7.4
1.5	Slightly Detailed	5.1
23.0	No Opinion	23.5

6. Do you feel that there was enough information about each of the various occupations?

Keith		Roosevelt
33.0	Definitely Yes	43.4
30.5	Somewhat Yes	26.5
13.0	Slightly Yes	2.9
3.0	Definitely No	13.2
7.0	Somewhat No	8.8
8.5	Slightly No	5.1
4.5	No Opinion	0.0

7. Do you think that there was sufficient variety of information about the various occupations?

Keith		Roosevelt
33.0	Definitely Yes	47.1
35.0	Somewhat Yes	29.4
8.5	Slightly Yes	4.4
8.5	Definitely No	5.9
6.0	Somewhat No	5.9
0.0	Slightly No	2.9
8.5	No Opinion	4.4

8. Do you feel that this information was and will be of use to you?

Keith		Roosevelt
68.0	Definitely Yes	73.5
10.0	Somewhat Yes	16.9
6.0	Slightly Yes	5.1
0.0	Dfinitely No	.7
0.0	Somewhat No	1.5
4.5	Slightly No	0.0
11.5	No Opinion	2.2

9. Did the computer-based material encourage you to explore occupations on your own?

Keith		Roosevelt
27.5	Definitely Yes	38.0
26.0	Somewhat Yes	29.0
23.0	Slightly Yes	11.0
3.0	Definitely No	7.0
3.0	Somewhat No	4.0
3.0	Slightly No	5.0
14.5	No Opinion	6.0

10. Do you think that the occupational information helped you to relate your knowledge about yourself to the characteristics of the various occupations?

Keith		Roosevelt
26.0	Definitely Yes	42.6
40.5	Somewhat Yes	36.0
13.0	Slightly Yes	11.8
4.5	Definitely No	1.5
1.5	Somewhat No	.7
1.5	Slightly No	1.5
13.0	No Opinion	5.9

11. As a result of the occupational information you've received, are you considering more or fewer possible occupational choices than before?

Keith		Roosevelt
19.0	Definitely More	25.0
32.0	Somewhat More	25.0
14.5	Slightly More	19.0
14.5	Definitely Fewer	15.0
4.5	Somewhat Fewer	7.0
6.0	Slightly Fewer	4.0
10.0	No Opinion	5.0

12. Which source of information was most helpful?

Keith		Roosevelt
76.5	Typeout on Sheets	52.0
11.5	Slides	8.0
11.5	Tape Recordings	40.0

ADDITIONAL EXPLANATION:

9.0	Typeout of a Useful Summary	14.0
38.0	Typeout Gave More Information than Slides or Tapes and Could Be Read Later	27.0
9.0	Slides Showed Conditions on the Job	6.0
7.0	Tape Interview Useful	29.0
35.0	No Explanation	20.0
1.5	All Sources of Information Equally Useful	3.0

13. Which source of information was least helpful?

Keith		Roosevelt
6.0	Typeout on Sheets	12.0
56.0	Slides	75.0
38.0	Tape Recordings	13.0

ADDITONAL EXPLANATION:

6.0	Typeout Does Not Have Enough Information	7.0
26.5	Unoriginal Slides	
11.5	Tape Not Really Instructive; Rehash of Computer Typeout	8.0
10.0	Tape Inaudible or Tape Broke	2.0
34.0	No Explanation	21.0
9.0	Too Few Slides	12.0
3.0	All Sources of Information Helpful	4.0

14. Compared to other sources of information (i.e., books, lectures, pamphlets, talks, etc.) the attention you were able to give to the computer-based information was:

Keith		Roosevelt
46.0	Definitely More Attention	42.6
14.5	Somewhat More Attention	25.7
16.0	Slightly More Attention	8.8
1.5	Definitely Less Attention	.7
0.0	Somewhat Less Attention	.7
1.5	Slightly Less Attention	.7
20.0	About the Same	20.6

PART III - Reactions to Procedures

1. If you had to make a choice, how favorable or unfavorable would you be towards computer-assisted occupational information as compared to other means of getting occupational information?

Keith		Roosevelt
58.0	Definitely More Favorable	49.3
24.5	Somewhat More Favorable	27.9
4.5	Slightly More Favorable	10.3
0.0	Definitely Less Favorable	.7
1.5	Somewhat Less Favorable	1.5
0.0	Slightly Less Favorable	1.5
11.5	No Opinion	8.8

2. How long do you think you could work efficiently with the computer at one sitting?

Keith		Roosevelt
7.0	Less than 1/2 Hour	1.5
27.5	1/2 Hour to 1 Hour	37.5
27.5	1 to 2 Hours	32.4
37.5	Over 2 Hours	28.7

3. In view of what you have learned in this program, how do you feel about the effort you put into it?

Keith		Roosevelt
58.0	Definitely Satisfied	55.9
20.0	Somewhat Satisfied	28.7
13.0	Slightly Satisfied	5.9
1.5	Definitely Dissatisfied	1.5
1.5	Somewhat Dissatisfied	1.5
0.0	Slightly Dissatisfied	1.5
6.0	No Opinion	5.1

4. Did you miss or wish for opportunities for discussion of problems during your sessions with the computer?

Keith		Roosevelt
11.5	Definitely Yes	22.8
26.0	Somewhat Yes	19.1
11.5	Slightly Yes	15.4
10.0	Definitely No	14.0
11.5	Somewhat No	11.0
7.0	Slightly No	1.5
22.0	No Opinion	16.2

5. Do you feel that you had adequate time to think about the information as it was presented during your sessions with the computer?

Keith		Roosevelt
29.0	Definitely Adequate	44.9
33.0	Somewhat Adequate	28.2
13.0	Slightly Adequate	9.5
3.0	Definitely Inadequate	3.7
7.0	Somewhat Inadequate	5.9
8.5	Slightly Inadequate	5.1
6.1	No Opinion	2.9

6. What is your opinion as to the sequence or order of presentation of information on the various occupations?

Keith		Roosevelt
46.0	Definitely Logical	47.1
23.0	Somewhat Logical	37.5
16.0	Slightly Logical	8.1
0.0	Definitely Haphazard	0.0
1.5	Somewhat Haphazard	.7
4.5	Slightly Haphazard	0.0
8.5	No Opinon	6.6

7. Which part of the total program helped you the most?

Keith		Roosevelt
	Outside Readings or Discussions	8.9
	Slides	14.4
	Type Outs	34.4
	Tape Recordings	32.2
	Opportunities for Reviews with the Counselor	20.2

8. Check any of the following phrases which you think apply to the keypunch and type outs.

Keith		Roosevelt
8.5	Confusing to Operate	0.0
2.0	Too Little Information	7.0
22.0	Too Little Time With It	12.0
10.0	Too Little Control Over It	7.0

8. (Continued)

Keith		Roosevelt
43.5	Easy to Operate	49.0
3.0	Too Much Information	5.0
3.0	Too Much Time with It	13.0
5.0	Not Very Active for Me	3.0
3.0	(YOUR OWN COMMENT)	4.0

9. Check any of the following phrases which you think apply to the tape recordings.

Keith		Roosevelt
	Confusing to Listen to	3.0
	Unpleasant Voices	7.0
	Too Short	16.0
	Useless Information	7.0
	Good Interviews	17.0
	Pleasant	3.0
	Too Long	16.0
	Helpful Information	25.0
	(YOUR OWN COMMENT)	5.0

10. Check any of the following phrases which you think apply to the slide pictures.

Keith		Roosevelt
	Unattractive	.7
	Useless	9.3
	Too Small	6.0
	No Connection with the Job	7.0
	Attractive	14.0
	Helpful	16.0
	Not Enough Detail	32.0
	Appropriate to the Job	11.0
	(YOUR OWN COMMENT)	5.0

11. What aspect of the program was most enjoyable for you?

Keith		Roosevelt
23.5	Typeout	25.0
15.0	Slides	3.7
11.0	Tape	19.1
4.0	Other	7.4
7.0	No Answer	4.4
30.0	Learning to Run Computer	23.5
7.0	Choosing Desired Job	10.3
2.5	Enjoyed All Parts Equally	2.9

12. What aspect of the program was least enjoyable for you?

Keith		Roosevelt
9.5	Typeout	15.4
31.5	Slides	25.0
26.0	Tape	9.6
15.0	Other	34.6
9.5	No Answer	8.1
8.0	No Source Helpful	6.6

13. What part of the program do you think will help you the most in making a future occupational choice?

Keith		Roosevelt
60.0	Typeout	50.0
9.5	Slides	0.0
13.5	Tape	16.2
9.5	Other	17.6
8.0	No Answer	13.2

14. What part of the program do you think will help you the least in making a future occupational choice?

Keith		Roosevelt
9.5	Typeout	7.4
46.5	Slides	44.9
30.0	Tape	9.6
2.5	Other	27.9
11.0	No Answer	9.6

15. List any comments, suggestions, or recommendatins which you might have to improve the usefulness of the computer-assisted occupational information system.

Keith		Roosevelt
11.0	More Information	
21.0	More Time	
6.0	More Slides	
2.5	Fewer Machine Breakdowns	
29.0	No Comments	
7.5	Computer Should Produce Information Faster	
14.0	Program Generally Helpful	
4.0	Fewer Slides	
2.5	Fewer Tapes	
0.0	No Typeout	
2.5	Better Quality Recording	

Appendix 2

LOCATIONS WITHIN PENNSYLVANIA IN WHICH THE INTERVIEWS AND PHOTOGRAPHS WERE COLLECTED, BY OCCUPATION

Tyrone

Baker
Policeman
Chem. Lab. Tech.
Auto Service Station Attendant

Hershey

Millwright
Machinist
Tool and Die Maker
Tool Designer

Harrisburg

Darkroom Developer
Rigger
Structural Steel Worker
Quality Control Technician
Gunsmith

Milton

Cabinet Maker
Carpenter
Dental Lab. Tech.
Diesel Mechanic
Radio and TV Serviceman

Bellefonte

Photographer
Auto Mechanic
Post Office Clerk
Practical Nurse
Surveyor
Medical Technologist
Medical X-Ray Technologist

State College

Computer Programmer
Glass Blower

Clearfield

Foundry Worker
Arc Welder

Trevorton

Salesman, Auto
Bricklayer
Rotary Driller
Auto Body Repairman
Air Conditioning and Refrigeration Mechanic

Williamsport

Exterminator
Insurance Investigator
Concrete Finisher
Tile Setter
Office Machine Serviceman
Boilermaker

Lockhaven

Aviation Mechanic

York

Fireman
Shoe Repairman
Lathe Operator
Lineman

Chambersburg

Farmer
Printer
Crane Operator
Electrician
Plumber
Mechanical Draftsman

Berwick

Barber
Building Maintenance
Dental Hygienist
Floor Layer

Kingston

- Air Traffic Specialist
- Miner
- Sign Painter
- Upholsterer
- Painter and Paperhanger
- Electronics Technician
- Optical Technician

Hazelton

- Vocational Industrial Teacher
- Instrument Repairman
- Telephone Installer
- Commercial Airplane Pilot
- Butcher
- Plasterer
- Construction Laborer
- Locksmith

VOCATIONAL
EDUCATION
DEPARTMENT
OF THE
PENNSYLVANIA
STATE
UNIVERSITY

Final Report

THE DEVELOPMENT AND EVALUATION OF A PILOT COMPUTER-ASSISTED OCCUPATIONAL GUIDANCE PROGRAM

(Project No. 16033, 17033, 18033)

(Appendix B: Printouts and Interviews)

Joseph T. Impellitteri
Principal Investigator

July 31, 1968

VOCATIONAL – INDUSTRIAL EDUCATION **Research Report**

PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION

Bureau of Vocational, Technical and Continuing Education

OCCUPATIONAL PRINT OUTS FOR COG I

November 27, 1967

MEMORANDUM

TO: The ERIC Clearinghouse on Vocational and Technical Education
The Ohio State University
980 Kinnear Road
Columbus, Ohio 43212

FROM: (Person) Clarence A. Dittenhafer (Agency) Pa. RCU

(Address) Bureau of Research 214 Executive House Pa. Dept. Of Public Instruction
P. O. Box 911, Harrisburg, Pa. 17126

DATE: November 7, 1968

RE: (Author, Title, Publisher, Date) Impellitteri, Joseph I, The Development and Evaluation of a Pilot Computer - Assisted Occupational Guidance Program, Pennsylvania State University, July 1968

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(3) Utilization of Material:
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Type of Program P
Occupational Focus P
Geographic Adaptability P
Uses of Material P
Users of Material P

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LIST OF OCCUPATIONAL PRINT OUTS FOR COG I

APPLIANCE SERVICEMAN

Appliance servicemen install, clean and repair all types of household appliances.

A high school education is not required, but is recommended. Most companies train their men through an informal on-the-job program with a skilled repairman. It may take about three years to become fully qualified. Also, training can be gotten through special appliance repair programs in high schools, post high school institutions, or correspondence schools.

A repairman works with customers. He often goes to the customer's home to fix appliances. The working area at a customer's home may be dirty and cramped, but repair shops are usually well-lighted and clean.

Servicemen may become foremen or service managers. Some may sell appliances or open their own shops.

Pay for skilled servicemen range from $1.75 to $3.65 an hour, depending on the type of employer and the area. Manufacturing firms often give fringe benefits not available from small employers. Work is not seasonal.

The employment outlook for the future seems to be good.

ARC WELDER

An arc welder joins pieces of metal by using heat and pressure, with or without a filler metal, to produce a permanent bond or weld. He must be able to plan and lay out work from drawings, blueprints or other written plans, know the properties of steel, cast iron, and other metals; he should know how to weld in all types of positions with different equipment; and he should know the proper order of operations for each job.

A high school diploma is not required, but desirable. A formal apprenticeship is not required, but some large companies will provide this for their employees. It takes several years of on-the-job training to become a skilled arc welder. High school courses in mathematics, mechanical drawing and blueprint reading are helpful. Certain jobs require the passing of welding tests.

Most welders work a 40 hour week, work both indoors and outdoors, work in all kinds of weather, and are often in high places at construction jobs. Those working indoors are more comfortable, and often sit at their work.

Salaries for arc welders range from $2.00 to over $3.50 an hour. Welders that belong to unions will earn more. You can become a welding technician, and with additional training, become an inspector or foreman. Many welders open their own businesses.

Employment outlook appears to be good.

Print Out
First 40 Occupations
November 16, 1967

AUTO BODY REPAIRMAN

He repairs cars and trucks damaged by collision, weather, etc. and straightens frames, removes dents from fenders and body panels, welds torn metal and new parts to the body, and paints cars.

A high school education is desirable, with courses in automechanics. Most repairmen learn the trade from on-the-job training, or serve a four-year apprenticeship program which includes related classroom teaching.

Most car body shops are noisy, dirty, and smell of car fumes. A repairman works in cramped positions with much of the work hard and dirty. The work is usually quite varied, requiring a broad knowledge of car repair skills.

Wages range from $2 to $5 an hour, depending upon the geographic area and size of the shop.

There is a chance to open one's own business, and in large shops there is some chance to advance to foreman, but small shops usually offer little or no chance for advancement.

The future employment outlook is fair. Because of the increase in car sales and accidents, body repairmen will be needed.

Print Out
First 40 Occupations
November 20, 1967

AUTOMOBILE MECHANIC

The automobile mechanic examines and finds the mechanical difficulties, discusses with the customer the extent and cost of damage or problem with the vehicle and then makes repairs.

A high school diploma is desirable. You can learn by working in training programs conducted by the U.S. Employment Service, and the Armed Services. Automobile companies operate special schools. Many learn by starting as helpers in large garages or by taking high school vocational courses.

Working conditions vary, but up-to-date shops are well ventilated, lighted and heated. Most work is done inside, but when crowded conditions or emergencies occur, some outdoor work may be required.

A mechanic usually works alone. The work is often greasy. Mechanics may become shop foremen, service managers, or sales managers. Many open their own shops or manage a service station.

Hourly earnings vary considerably with the average around $3.00 per hour. Skilled mechanics sometimes get a part of the labor costs charged a customer. The work week is 40 hours and occasional overtime is common.

This occupation is expected to show a rapid growth due to the increase in the number and complexity of motor vehicles.

Print Out
First 40 Occupations
November 16, 1967

AUTOMOBILE SERVICE STATION ATTENDANT

He services cars with gas, oil, and parts; pumps gas, and cleans the windshield. He washes cars; checks the radiator, tires, batteries, oil and brake fluid; and may do minor repairs.

Most training is on-the-job, although there are some training programs in high school vocational programs and through oil companies. It usually takes several months on the job for an attendant to become fully trained. A high school diploma is usually required in order for attendants to qualify for service station management training programs which are approved by oil companies.

Most attendants work more than 40 hours a week and often work at night, weekends and holidays. They work outdoors in all kinds of weather and frequently work around grease and dirt.

Wages vary considerably with the average between $1.25 and $2.00 an hour, with higher pay coming from the larger stations. Chances exist to go into business for yourself. An attendant may also become a mechanic or go into service station management with an oil company (with additional training).

The employment outlook appears to be good due to the increased automobile sales and greater use of them.

Print Out
First 40 Occupations
November 16, 1967

AVIATION MECHANIC

Airplane mechanics keep airplanes flying safely and efficiently, make emergency repairs, and routine overhauls on all kinds of airplanes. They must be able to find the troublo, make adjustments or repairs, and be able to test repaired parts for proper operation. Some specialize in power plants or air frames.

The airplane mechanic must have a high school diploma. You may learn by starting as a helper or apprentice. This might involve training as an apprentice for three or four years in one of the programs sponsored by a large airline, graduating from an FAA approved mechanic's school, by completing a two-year airplane mechanic's program taught at a college or university, or through Armed Forces training. You must pass a test and be licensed by the Federal Aviation Agency.

A 40 hour week is normal (possibly shift work) in well-lighted and well-ventilated shops and outside in all kinds of weather. Generally the work is dirty due to working on exposed surfaces such as engines. You cannot be colorblind. Average earnings for skilled aviation mechanics range from $600 to $700 per month.

A regular mechanic could become a foreman or go into business for himself.

Licensed mechanics have little trouble finding work. Future employment chances should be good.

Print Out
First 40 Occupations
November 14, 1967

BARBER

A barber cuts and styles hair according to the customer's instructions. He also shaves, gives facial massages, shampoos, and fits wigs or hair pieces.

In most states barbers must be licensed. This usually requires certain health requirements, a minimum age of 16, completion of eight years of public school (some states require a high school diploma) the completion of a training program, and a test. Barber training is offered in some public schools and in barber schools across the country.

Barber shops are generally clean, and comfortable. Work is indoors, and a barber must deal with all types of people. In most cases, advancement means the building up of a good clientele, owning one's own shop, or teaching in a barber school.

Weekly earnings may include tips and commissions; salaried barbers usually average between $65 and $150 per week, and full-time barbers work more than 40 hours per week.

Opportunities for barbers are expected to increase moderately.

Print Out
First 40 Occupations
November 14, 1967

BRICKLAYER

He is a skilled craftsman who constructs walls, partitions, fireplaces, and other structures from brick. He reads architectural blueprints in order to determine how to lay out and erect foundations, walls, and other structures. He may also work in factories where he installs the brick linings in kilns and furnaces.

Three to four years of formal apprenticeship training is required. Apprenticeship applicants must be between 18 and 24 years old. this training includes classroom instruction, as well as on-the-job training. A high school diploma is recommended.

Bricklayers work indoors and outdoors. The work is strenuous and requires a great deal of physical activity. The work is somewhat seasonable, and the worker may have to travel from one community to another in order to keep working.

Earnings are from $3.25 an hour to around $5 an hour, depending upon the location of the job. Although hourly rates are high, yearly earnings usually reflect seasonal layoffs. The bricklayer normally works a 40 hour week with overtime.

Advancement opportunities are limited, but he may become a foreman, superintendent, or go into business for himself.

As long as the building industry continues to expand, the demand for bricklayers will continue.

Print Outs
First 40 Occupations
November 14, 1967

BROADCAST STATION TECHNICIAN

Broadcast technicians set up, operate, and maintain the equipment used to transmit radio and television programs. They repair and maintain the equipment, keep records of repairs, and set up and operate equipment at remote places to relay programs back to the studio.

He needs a high school diploma and should complete an electronics-technician course at a technical school or junior college and complete an on-the-job training program. He needs a Federal Communications Commission License. Armed Forces and hobby experience in radio and television is helpful.

Although there are exceptions in radio, most broadcast work is in large areas, and most specialized jobs are found in New York, Washington, Chicago, and Los Angeles. Shift work may be required. Working hours vary from 35 to over 40 hours per week. Some danger is involved with electronic equipment. Higher salaries are found in large television stations with beginning salaries starting around $60 and averaging around $100 per week. Chance for advancement is good; one can advance to a more desirable shift, become supervisor, earn more money, or specialize.

Although automation may decrease the number of technicians needed for some jobs, generally a slight increase in jobs is expected. Competition will be keen for all jobs, and you will need to keep up with new developments in broadcasting through constant study.

Print Out
First 40 Occupations
November 16, 1967

CABINETMAKER

A cabinetmaker is a skilled carpenter who makes furniture, staircases, cabinets, etc. He works from drawings and blueprints in order to shape, assemble, cut, join, and finish wood. All types of woodworking machines and tools are useful.

Employers usually prefer a high school diploma and an apprenticeship of about four years which combines classroom and shop training. High school courses should include some geometry and shop mathematics as well as practice in woodworking.

Cabinetmakers usually work inside. Working conditions vary from large, comfortable shops to small dusty, and badly lighted shops. A normal work week is 40 hours with overtime. There is a good deal of standing, reaching, and lifting.

Salaries range from $2 to $5.50 an hour. The more skilled a person is the higher his salary will be.

Advancement can range from helper to bench assemblyman, to cabinetmaker, to layout man or group leader, to foreman and shop superintendent. Many cabinetmakers go into business for themselves.

Employment outlook seems to be good because of expected growth in commercial and residential construction. The growth in commercial and residential construction. The cabinetmaker must keep pace with changes in his occupation--this may require additional training and education.

Print Out
First 40 Occupations
November 20, 1967

CARPENTER

A carpenter constructs, erects, installs, and repairs buildings and structures of wood, plywood, and wallboard. He builds concrete forms, erects scaffolding in temporary buildings at construction sites, installs floor coverings, builds houses and other types of buildings, etc. Some carpenters will specialize in a certain area of carpentry.

A high school diploma is required and completion of a four year apprenticeship program is recommended. This program includes on-the-job training as well as related classroom instruction.

The minimum wage for union workers averages around $4.40 per hour. Salaries usually range from $3 to $5.50 per hour.

The normal work week is five days, forty hours per week. This may be increased depending on the job. A carpenter's work is active and strenuous, but unusual strength is not required. There is a chance of injury from falls, etc. and from the use of sharp tools. Most work is performed out of doors. Work can be seasonal, and most carpenters work fairly steady from six to nine months each year.

Carpenters may advance to foremen or general construction foremen. The chance for advancement is usually greater because they must be familiar with all phases of building construction.

Employment is expected to increase slowly for the next few years. It will be affected by business trends and the economy.

Print Out
First 40 Occupations
November 14, 1967

CHEMICAL LAB TECHNICIAN

A chemical laboratory technician works with chemists and chemical engineers in the development, production, and sale of chemical and related products and equipment. He must analyze and solve engineering and scientific problems, and prepare reports on examinations, experiments, etc. Technicians work in research and development and supervise some operations in the production of chemical products.

A high school diploma is usually required plus training in chemical technology at a junior college or technical school. Armed Forces training will help. Most laboratories are comfortable and chemical odors are minimized. A technician must often stand and is supervised by a superior. A normal work week is usually 40 hours a week with some overtime. Salaries usually range from 6,000 to 9,000 dollars a year for more experienced personnel.

Advancement is usually limited without a college degree; however, with a college degree a chemical technician can advance to a chemist, process foreman, plant supervisor, chemical salesman, etc.

The employment outlook seems to be good, but the demand will be greatest for graduates of technical schools and junior college programs.

Print Out
First 40 Occupations
November 14, 1967

COMMERCIAL AIRPLANE PILOT

A commercial airplane pilot flies an airplane for hire. A captain or pilot on an airline may fly the plane and supervise a crew which includes a co-pilot, flight engineer, and flight attendants. Pilot or co-pilot will chart the course of the flight before take off, check weather conditions. and check over the plane. During the flight the pilot and co-pilot will supervise naviagtion, check plane instruments, fuel load, condition of engines, etc.

A high school diploma is required, some college desired, and a license from the Federal Aviation Agency required. The major requirement for a commercial pilot's license is a minimum of 200 hours of flight experience. Applicants for license must be at least 18 years old and experience may be obtained through instruction in a flight school or the Armed Forces.

Flying could involve some hazards, the working hours change and on some jobs you could not plan to be home on weekends or holidays. Pilots often have to stay at points away from home. Salaries vary with the airline and years of practice. Salary range is from $6,500 for an airline pilot just starting on a small airline to $35,000 a year for a more experienced pilot in a big company.

Advancement usually starts as one becomes a co-pilot or flight engineer then becomes a pilot. From there advancement depends on seniority and ability. Many pilots go into business for themselves. Some opportunities exist for a captain to advance to chief pilot, flight operations manager or supervisory positions.

Employment outlook is fair for scheduled airline pilots, but appears to be good for other areas of commercial aviation such as crop dusting, air surveys, flying for large industrial corporations, air charter service, etc.

Print Out
First 40 Occupations
November 16, 1967

COMPUTER CUSTOMER ENGINEER

The computer customer engineer installs, and services electronic computers and equipment. He tells customers about the operation, and care of computers.

A high school diploma with training in a technical school or junior college is needed. Armed Forces training can also be helpful.

Most work is done in clean, well-lighted areas. This is a white-collar job with a 40 hour work week. Overtime may be needed. Shift work and travel between customers is often required.

Salaries range from $5,000 to $8,000 and in time up to $10,000 per year. Average salaries are from $6,000 to $7,000. Advancement appears to be good for experienced computer customer engineers. They can specialize in computer work or go into management.

It is expected that the employment demand for computer customer engineers will increase quickly due to a high demand for computers, but they computer customer engineer must keep up with new developments in computers.

Print Out
First 40 Occupations
November 16, 1967

COMPUTER PROGRAMMER

A computer programmer develops and prepares flow charts (drawings) for the solution of scientific, mathematical, business and technical problems by automatic data-processing equipment. He analyzes the problem, prepares the steps in machine operation, writes detailed instructions, and makes sure the program works on the machine. He does the thinking that makes the computer work.

A high school diploma is required, and a college degree or equivalent experience is needed for jobs with the Federal Government. In industry, college graduation is not required. Training is offered in high school and post high school technical courses, Armed Forces, and junior college programs. High school course in business, mathematics, science, etc. are needed.

Programmers usually work in modern comfortable offices. The work is not considered dangerous, and no particular physical requirements have been established. The standard work week is usually between 35 to 40 hours, and some week-end work or overtime may be required.

Beginners usually receive around $4,000 to $4,500 per year, while those with more training and experience may start from $5,400 per year and up. Senior programmers can earn $10,000 a year and more.

Chances for advancement are good. On large operations junior programmers may become senior programmers after several years of experience. Promotions are possible to higher positions such as programming manager, computer center manager, etc.

Employment opportunities are expected to be excellent. They will increase as new jobs are found for computers.

Print Out
First 40 Occupations
November 16, 1967

CONSTRUCTION WORKER

Construction workers carry out various tasks to help and assist building craftsmen. Their work includes handling construction materials, grading and moving earth, erecting and removing scaffolding, demolition of old buildings, etc. They work in all types of construction, above, on, and below land and water.

A high school education is not required nor is any other formal training to get a job as a construction laborer. Some activities require skill, but this can be obtained on the job. With changing working conditions, it appears that a high school diploma will someday become necessary.

Working conditions vary. Experience and interest in some area can lead to an apprenticeship or training in a particular trade. There are few opportunities for advancement in labor work itself.

Wage rates are good as compared with other types of manual work, with an average of around $3.30 per hour plus fringe benefits. Because of the seasonal nature of the work, temporary delays and the shifting of construction sites, this work is not as steady as many other types.

Job openings can be found in nearly all parts of the country, but a person with a high school diploma usually has a better opportunity for finding work. Even though there are many people in this occupation, they are not in great demand.

Print Out
First 40 Occupations
November 14, 1967

COOK-CHEF

A cook prepares foods to satisfy the customer's senses of sight, taste, and smell by following recipes. Chefs are responsible for appetizers, side dishes, and desserts, as well as the main courses.

First class cooks for large hotels, restaurants, and institutions usually have a high school education and complete an apprenticeship or trade school program. Those holding lesser jobs seldom have any formal training. The work is indoors, but conditions vary widely. Modern facilities are usually well-lighted, well-ventilated, and reasonably spacious. However small establishments are often obsolete in equipment and are crowded. Cooks may be required to work long hours which have alternate rush and slack periods. Employers usually supply uniforms and tools. A health certificate is required.

Advancement to cook usually involves several years, and promotion to head cook may take 15 to 20 years.

Salaries vary widely with large organizations, often paying several times that of small restaurants.

Skilled and experienced cooks in large hotels, etc., can earn up to $14,000 annually, while a few nationally known chefs earn far more.

Due to high turnover the majority of openings are at the medium and low-price restaurant level. Hospitals, schools, factories and department stores also offer many job possibilities. First class chefs are in demand.

Print Out
First 40 Occupations
November 16, 1967

IBM MACHINE OPERATOR

An IBM machine operator is expected to operate the different kinds of mechanical equipment which are required whenever an electronic computer is being used.

A high school education is needed. Some training is offered in technical schools, etc. Most employers provide training after the worker is hired--training period length will vary with the type of job.

The work is generally done in well-lighted, well-ventilated, air-conditioned offices. Most of the work is routine, and you will work with others under pressure in order to meet deadlines and due-dates. Some shift work may be necessary (many computers are operated on a two or three shift basis).

Salary for the various jobs range from $65 to $135 per week. As you gain experience you may be assigned to more complex pieces of equipment, be promoted to supervisory positions, or jobs which require some supervisory duties with machine operation.

This field is expanding very rapidly and the need for new operators should be high.

Print Outs
First 40 Occupations
November 14, 1967

DIESEL MECHANIC

Diesel mechanics diagnose trouble, disassemble, repair or replace defective parts, as well as reassemble, adjust and test diesel engines. Some mechanics specialize in troubleshooting, repair, or preventative maintenance. Diesel engines are used primarily in heavy-duty motor vehicles, and as stationary power plants.

Many start their training as mechanics repairing gasoline powered vehicles, or learn through apprenticeships or by attending vocational, trade or technical schools. High school shop work and Armed Service training are useful in reducing training time which usually lasts two to four years. A high school diploma is useful.

Many small shops have poor heating, lighting, etc., but large, new shops are usually pleasant. Emergency repairs outdoors and at night at construction sites, etc. are common. Working on greasy equipment is an everyday occurrence. Mechanics are required to have their own tools which they acquire over a long period of time.

A skilled mechanic may become a foreman or service manager in large organizations. Diesel mechanics usually receive from \$2.50 to \$4.00 per hour and work a regular week of 40 hours with overtime.

A moderate increase is expected through the 1970's due to increased construction and replacement of gasoline powerplants by more efficient diesel engines.

Print Out
First 40 Occupations
November 16, 1967

MECHANICAL DRAFTSMAN

He transfers ideas, sketches, and specifications of engineers, architects and designers into working plans and drawings so that things can be manufactured and constructed. He makes some engineering calculations, checks the dimensions and relations of the parts and transfers ideas into plans and blueprints.

A high school diploma followed by two years of technical training in mechanical drafting is now usually required for beginners. Training may be given on the job to high school graduates who have had three years of mechanical drafting and two to three years of mathematics and physics.

He works indoors, usually in comfortable quiet surroundings. He stands or sits at his drawing board most of the day. The job is quite exacting requiring workers to stand in one place for long periods of time.

The average salary for beginning draftsmen who have completed a two-year technical or junior college program is around $4,300 per year. The average for draftsmen with ten or more years of experience is around $8,500. Chief draftsmen can earn at least $12,000 per year. A 40 hour, five day week is common with some overtime.

Promotions come with an increase in experience and skill. He may be able to advance from assistant to junior draftsman to senior draftsman, and then to chief draftsman.

The outlook is good for people with training and experience.

Print Out
First 40 Occupations
November 16, 1967

ELECTRICIAN

Electricians assemble, install, repair, and test electrical fixtures, wiring, machines, appliances, and motors.

A high school education is preferred by most employers. Experience can be obtained from vocational schools, Armed Service training, and on-the-job by helping a skilled electrician. Serving an apprenticeship is helpful.

Many states require electricians to be licensed and they must pass a test on knowledge of building codes and electrical skill. Although work must be done outdoors while testing or in emergencies, generally it is done indoors. The normal work week consists of a 40 hour week with overtime.

Advancement can be to foreman, estimator, and many electricians go into business for themselves. Salaries range from about $3 to $5 per hour. Electrical work itself is not seasonal, but employment may be because construction work is usually affected by weather conditons.

The number of openings is expected to increase due to the general increase in all types of construction and the increased use of electrical power in both industry and private use.

Print Outs
First 40 Occupations
November 14, 1967

ELECTRONICS TECHNICIAN

An electronics technician assists the scientist and engineer by analyzing breakdowns in electronic equipment which these men use. He may make minor changes in design or replace certain parts to improve the performance of the equipment. He must analyze engineering and scientific problems, write reports on experiments and tests, and maintain and design electronic equipment. The technician works in the areas of research development, and the manufacturing of electronic equipment. They also install and maintain this equipment.

A high school diploma is required, and one to three years of study with on-the-job training. This training is offered by technical, junior or community college. A person with a high school diploma can sometimes become a technician through Armed Forces training, on-the-job training and taking classroom courses and correspondence courses in his spare time.

Most work is done indoors in clean, well-lighted and adequately ventilated work areas. A 40 hour work week is average with some night work required.

Technicians usually start around $5,000 per year and range to around $10,000. Earnings depend upon education, technical specialty, and experience. Technicians may advance to supervisor or other administrative and sales positions.

This appears to be one of the fastest growing occupations, and all indications are that it will continue to be this way in the future.

Print Out
First 40 Occupations
November 14, 1967

FARMER

A farmer manages and raises livestock and cultivates food plants for production. He operates different farm machines in preparing, planting, and harvesting his crop, and keeps records of production costs for livestock and crops.

Growing up or working on a farm is good training. Training may be obtained in high school vocational courses, post high school or college programs. A college education is helpful in managing a large farm or farm corporation.

A farmer is an independent businessman and can plan his work day to suit his particular needs. He may be required to work hard for long hours in all types of weather.

Earnings depend on the size of the farm, fertility of the ground, and equipment etc. For local information regarding farmers, see your counselor.

Since the farmer is his own boss, advancement may come through expansion of his operation, or through public agricultural work at the local, state, or federal government level.

The cost of starting a farming business has gone up causing a trend toward larger but fewer farms. Few new farms will be started and few of those will be operated by youth not having a farming background and a large capital investment. There will be opportunities to enter government service as a farm agent, food production industry, farm management, etc.

Print Out
First 40 Occupations
November 14, 1967

HEAVY CONSTRUCTION EQUIPMENT OPERATOR

Heavy construction equipment operators run power shovels, cranes, earth movers, back hoes, bulldozers, etc. The operator is a highly skilled worker who can operate several types of equipment.

Completing a three year apprenticeship is the best method of entering this trade, although some start as mechanics or helpers. A high school education or its equivalent is usually required.

Nearly all work is outdoors and in all kinds of weather. Although the regular work is 40 hours, overtime and weekend work is often required to make up for temporary delays, bad weather, or to meet construction deadlines.

Apprentice wages start at about 65 per cent of the journeyman's rate and are increased as the trainee proceeds through the instruction. Hourly rates vary according to the type of machine, its size, the kind of job being done and geographical location. An approximate average would be three dollars to four dollars per hour plus overtime. Work may be seasonal and operators may have to travel to get new jobs.

Experience can lead to becoming a foreman or job superintendent--these openings do not occur often.

Employment opportunities are expected to continue to rise significantly through 1975 due to general increase in construction.

Print Out
First 40 Occupations
November 14, 1967

LINEMAN AND CABLE SPLICER

Lineman and cable splicers work together as a team which constructs and maintains transmission lines whether above or below ground. The work includes all the necessary steps from digging holes for poles and underground tunnels to attaching service entrances to customers' homes or businesses. They also stretch and maintain transmission lines and towers.

Training is usually supplied by the employer, although some high school classwork in electricity and science and Armed Service training is helpful. Applicants must have a high school education, and pass a physical examination. It takes about six years for a lineman to reach the top pay for his job.

Nearly all work is done outdoors. Since emergencies are often caused by weather, much work may be done under severe weather conditions. Climbing poles and crawling through manholes is routine.

A lineman may advance to line foreman, superintendent, etc. and if he is in the telephone industry, he can become a telephone installer or telephone repairman.

Cable splicers have higher average earnings than linemen with an average of $3.30 per hour as compared with $2.70 per hour. Experienced personnel earn approximately $147 for a 40 hour week.

Job opportunities exist in every state with the greater number in the more populated areas. But, due to improvement in equipment and techniques, the number of new openings is expected to decline.

Print Out
First 40 Occupations
November 14, 1967

MACHINIST

A machinist sets up and operates machine tools, to make or repair metal parts according to specifications outlined on blueprints and sketches. He must be able to operate all types of machine tools, must possess a broad knowledge of shop practices, and know the properties of metals.

A high school diploma is required, and a four-year apprenticeship program is recommended. This includes on-the-job training as well as related classroom instruction. Vocational preparation in high school is frequently desired by many employers.

A five day, 40 hour week is most common, with some overtime and shift work sometimes required. Work is normally steady and the work is not strenuous, but it does require standing most of the day.

Salaries average around \$2 to \$3.50 an hour depending upon the degree of skill the worker has. A man may advance to foreman, supervisor, and with additional training and education become tool and die makers, instrument makers, or tool designers. They can also open their own shops.

The employment outlook is fair. With increased automation, opportunities for jobs may not be as great.

Print Outs
First 40 Occupations
November 14, 1967

MEDICAL X-RAY TECHNICIAN

A medical x-ray technician operates x-ray equipment under the supervision of a physician who specializes in the use of x-rays. They position the patient, adjust the film and equipment, and operate the controls to obtain x-ray pictures of the internal parts of the body. They also maintain the equipment, and keep records. Some technicians operate x-ray equipment for the treatement of disease.

A high school diploma is usually required, and some college may be needed. It is useful to complete a 24-month course in x-ray technology. Some courses in x-ray technology are offered by vocational or technical schools. Training programs are offered by hospitals or by medical schools affiliated with hospitals.

The usual work week is 40 hours with occasional overtime duty. There is some danger from x-ray radiation, and those with a tendency toward anemia should discuss this with their doctor.

Beginning salaries range from about $75 to $90 a week and salaries in general range from $6,000 to $10,000 a year. Although advancement is limited, the employment outlook appears to be excellent.

Print Out
First 40 Occupations
November 14, 1967

PAINTER AND PAPERHANGER

A painter and paperhanger estimates the kinds and amounts of materials needed for a job, prepares surfaces for painting(like cleaning, sanding, burning, steaming, etc.) to be covered, and then applies either paint, paper, fabric, or other covering.

Apprenticeship training is considered the best method of learning the trade, although many learn by helping an experienced craftsman. High school graduation is desirable.

Painting involves indoor and outdoor work. Paperhanging is nearly always done indoors. Both require the use of scaffolding and ladders and frequently working with the arms above the head. Chemical fumes and dust caused by paints or cleaning materials for surface preparation, may cause some discomfort. Sometimes work must be done during the evenings or on weekends when businesses are closed.

Advancement may result in promotion to foreman, job estimator, superintendent of large painting crews, or going into business for one's self. The average union hourly wage is about $4.11, and work is seasonal.

Employment opportunities are expected to increase slowly, and new covering materials and application methods are limiting the number of new positions even though the construction and alteration of buildings is increasing.

Print Out
First 40 Occupations
November 16, 1967

PLUMBER

A plumber installs and repairs pipes and fixtures that carry water, steam, air, liquid or gases needed for sanitation, and industrial production, etc. Plumbers work with glass, plaster, steel, copper, lead and ceramic piping, and with many kinds of hand and power tools.

You should have a high school diploma, and complete a formal apprenticeship. In many areas passing a test on building codes and skill is required before becoming a licensed journeyman plumber. theory and background knowledge can be obtained with correspondence courses, and some learn the trade by starting as a helper.

Plumbing is often a mixture of outside and inside work under general construction conditions. Usually work is done on the job, so conditions will vary.

Average wages are about $4.75 per hour. Seasonal layoffs are unusual and year-roung work is common.

Employment is expected to be good due to a rapid increase in all types of construction. Plumbing is not overcrowded, and the demand for more and better quality work should grow.

Print Out
First 40 Occupations
November 16, 1967

POLICEMAN

Police officers help preserve law and order. As government employees, their job involves preventing and investigating crimes, and apprehending and helping to prosecute offenders.

Employment as a police officer is based on age (21), performance on a test, physical and personal qualifications, education and experience. Some cities may accept recruits without a high school education. Training is received on-the-job and at police schools or from colleges. Since requirements, vary you should inquire in the area where you want to work.

Policemen are involved in all kinds of situations inside and outside and in all kinds of weather. Physical strength and stamina are required. The overall working situation has a semi-military atmosphere including assigned duty, 24 hour call, regulated living distances, and job titles. Officers may have specialized assignments; and injury rate is higher than in many occupations.

Promotion comes after completing certain periods of service, training, and experience, etc. Promotions are made in accordance with each candidate's position on a promotion list, as well as his performance on written examinations and as an officer on the job.

Policemen are paid salaries which usually start around $5,000 per year. The regular work week is usually 40 hours plus some overtime and work on weekends and holidays. Schedules are often on shifts and they are paid time and a half for overtime. Most departments give a clothing and equipment allowance as well as many fringe benefits.

Police services are expected to grow throughout the future although fewer will be used on routine assignments such as directing traffic, etc.

Print Outs
First 40 Occupations
November 14, 1967

POSTAL CLERK

A postal clerk is a federal employee who is connected with the collection and distribution of mail. Among other duties he may sort and distribute mail, inspect out-going mail, cancel stamps, work at a window and sell stamps.

Although special training is not required for most post office jobs, a high school education is useful. Applicants must pass a civil service examination which includes English and arithmetic. Most employees begin with a probationary period of one year. Some post offices provide formal training, others do not.

Working conditions vary depending on the job and the location of the post office. The work is often physically strenuous because the clerk must do considerable walking, throwing and stacking of mail sacks. He's on his feet much of the time and may have to handle heavy sacks of mail, but window clerks require less physical exertion and their job is usually more varied since they work with the public. Shift work and some night work may be required.

Most clerks start at around $5,000 per year and can increase to over $7,000 after many years of service. There is additional pay for those working night shifts.

Opportunities for advancement are rather limited, but there are some high-level jobs. Compared to the number of employees, these jobs are relatively few. As seniority increases, however, preferred assignments are more readily available.

The employment outlook appears fair. Recent technological advances will keep the level of new employment down.

Print Out
First 40 Occupations
November 16, 1967

PRINTER

Printing is a means of transferring impressions of words, numerals, symbols, and other illustrations onto paper, metal, or other material. Printing is used in the publishing of newspapers, books, business forms, etc.

A high school diploma, and a four to six year apprenticeship are usually needed to become a skilled printer. Most training is directed towards some special job in the printing operation. These include composition, press work, or binding, etc.

Printers work indoors around printing presses which are dirty, smell from ink, and are very noisy. Frequent shift work is required although most printers work from 35 to 40 hours per week. Workers are often under pressure to complete jobs by a certain time.

Salaries range from $1.64 to $5.67 an hour depending upon the particular job, area, and skill involved.

Opportunities for advancement are quite good. There are many different areas in the printing occupation into which a skilled worker can advance.

The employment outlook is fair, although many jobs will be available for skilled printers. Technological advances will slow employment somewhat.

RADIO AND TELEVISION SERVICEMAN

He repairs, adjusts, and installs radio and television receivers, phonographs, tape recorders and other electronic equipment used in the home. He analyzes equipment to determine what is wrong and then makes the necessary repairs. He may also sell new and used television and radio sets in the shop, and may repair and rebuild trade-in models for resale, as well as salvage useable parts from old sets.

A high school diploma plus one to two years of specialized training or a four year apprenticeship is usually required to become a radio and television repairman. Armed Forces training and amateur radio skill are useful.

He spends his time working in the shop and making service calls. The shop may be cramped but is generally comfortable. There is some danger in installing antennas, and with electrical shock. Considerable physical activity is involved.

Beginning salaries range from $50 to $75 a week. The average weekly range for an experienced serviceman is $80 to $165. A six day, 48 hour week is generally normal, with evenings and weekend work.

There is not much opporuntity for advancement. The main possibility is opening one's own shop after gaining the necessary experience.

The rapid growth in the field of radio and television promises many future job opportunities.

Print Out
First 40 Occupations
November 16, 1967

AIR CONDITIONING AND REFRIGERATION MECHANIC

He installs and services commercial, industrial and home air conditioning, coolers, and refrigerators. He must connect duct work, lines and other piping when installing units and be able to fix the equipment he installs.

A high school education is desirable with two years of special training offered in technical schools, junior or community colleges or the Armed Forces. On-the-job training is often available.

Normal work week is 40 hours with overtime, although emergencies may require work at night, Sundays and holidays. There may be some layoff in the winter. Although most work is done indoors in clean, well-lighted shops, workers are exposed to dirt, oil and noise.

Wages range from $3 to $4.75 an hour depending on the geographical area. Mechanics doing only maintenance and repair work usually get from $2 to $3.25 per hour. Mechanics may become technicians, foremen, or go into business for themselves--advancement to supervisory positions is usually limited.

The employment outlook for the future looks good. Increase in the use of air conditioning equipment will lead to many job opportunities.

Print Out
First 40 Occupations
November 16, 1967

ROOFER

Roofers apply shingles, slate, tile, metal, and all types of composition roofing materials to roofs of buildings, as well as repair and maintain roofs. They also waterproof walls and other building materials.

Roofers generally serve a three year apprenticeship which covers all types of roofing work. A high school education is desirable. Many roofers learn their skills by working as a helper, and good physical condition is important.

Roofers may work in a different area every few days or weeks. The work is strenuous and there's a great deal of standing and climbing over roofs of large, high buildings. There is a danger from falls and work is generally carried out in all types of weather. The regular work week is 40 hours with overtime.

The average salary is approximately $4.20 an hour with a range of $2 to $5.50 an hour depending upon the location.

Roofers may advance to foreman or superintendent, or go into business for themselves.

Presently opportunities for employment are somewhat limited; however, an increase in construction activity will increase the demand for skilled roofers.

Print Outs
First 40 Occupations
November 14, 1967

SURVEYOR

A surveyor locates and measures points, lines and contours of the earth's surface to secure information for construction, map making, etc. He gathers information needed to conduct surveys from notes, maps, or other records, and he keeps careful notes and records of the work he does.

He should have a high school diploma with courses in algebra, geometry, trigonemetry, calculus, drafting, and mechanical drawing. If he wants to specialize, a college degree is usually required in engineering or the physical sciences. A high school graduate usually will receive on-the-job training.

Although a great deal of time is spent preparing reports and drawing maps, most work is performed out of doors and good physical condition is required. Surveyors may have to live at the job site, travel long distances, and frequently change job locations. A 40 hour week is average (although longer hours are usually worked during the summer months).

Surveying aids (with no experience) start around $3,385 per year with the Federal Government. High school graduates start about $3,680 per year. Student trainees with the Federal Government start at $4,480 per year and college graduates with engineering degrees begin at $6,000 to $7,000. Construction company salaries vary with some surveyors being paid up to $175 per week. Employment may be seasonal.

With only a high school diploma you start as a rodman, then with additional training and experience you can probably advance to chainman, instrumentman, surveyor, or crew chief. Often these advancements are made through written tests as well as experience.

Long term outlook is favorable although some retraining may be necessary.

Print Out
First 40 Occupations
November 16, 1967

TELEPHONE INSTALLER

Telephone installers remove, install and service telephones, set up equipment for switchboards, radio and television broadcasts, mobile radio-telephones, and teletype machines.

A high school education is preferred. This is usually followed by training with the employing company. Vocational training in high school or by the military services can be helpful. Training continues throughout the workers' career both in the classroom and on-the-job. Apprenticeships usually last about four years.

Work is both inside and outside and requires driving a company truck from job to job. Central exchange installers work inside usually in comfortable buildings. The job involves climbing poles, working at odd hours due to breakdowns, and dealing with customers. Usually the worker must supply his own hand tools.

Advancement is usually to higher paying jobs, or transferring into management. These opportunities are open only to well-qualified personnel.

The standard work week is 40 hours plus overtime when necessary. Entrants start at about $70 per week and o up tc about $150 as experienced installers. Technological changes are limiting the number of new personnel needed, although once located the work is usually steady.

TOOL AND DIE MAKER

Tool and die makers are highly trained machinists. They specialize in producing devices to hold metal while it is being machined, shaved, stamped, shelled, etc. Die makers construct metal forms which are used in stamping and forging operations to shape metals, plastics, glass, etc. They use almost every kind of machine tool and precision-measuring instrument. They work with all of the metals and alloys, and may help design the equipment they use.

A high school diploma is required, and a four to five year apprenticship is desired. Knowledge of mathematics and physics, as well as mechanical ability are necessary.

Work is done indoors in well-lighted, noisy shops with all types of machine tools. Eearnings range from $2.40 an hour to over $4.50 an hour in large cities. A 40 hour work week is average, but during heavy work loads overtime may be necessary.

There is a chance for advancement to supervisor and administrative positions. Many tool and die makers become tool designers. Some open their own tool and die shops.

The employment outlook for these skilled craftsmen is very good. The expansion and changes taking place mean many more openings for qualified workers.

Print Out
First 40 Occupations
November 16, 1967

TOOL DESIGNER

A tool designer designs tools and devices used in producing manufactured articles. He works with blueprints and engineering information to find the best tool for that job. He must know the types of materials used in tool production, be able to calculate dimensions and tolerances, and be able to understand the mechanical processes. He must also work with both shop and engineering personnel.

A high school diploma is required. A five year apprenticeship is desired, but a two to three year technical course and on-the-job training can be sufficient. Ability in math and drafting is helpful as well as Armed Service training.

Most work is indoors, usually in the drafting department of manufacturing concerns.

Salaries range from $6,000 to $10,000 per year for a 40 hour week with some overtime work required.

Opportunities for advancement are favorable with additional education and training, and the employment outlook appears to be fair.

Print Out
First 40 Occupations
November 16, 1967

TRUCK DRIVER

The truck driver drives all types of trucks that carry all types of goods and materials and may drive locally or over long distances.

Training and experience requirements vary with the job. Local routemen may need only a regular driver's license while inter-state drivers may need a high school education, chauffeur's license, experience as a local light truck driver, have to pass an examination upon completion of a company training program, and learn Interstate Commerce Commission rules. Inter-city and interstate drivers must be 21 years old.

A driver may have to load and unload his truck during day and night deliveries. He will be driving in all kinds of weather and many times at odd hours of the day and night. Many drivers own their own trucks and must deal with employers to obtain contracts for work. Long distance runs could keep you away from home for weeks at a time.

Advancement may come in the form of seniority, increased earnings, better hours and routes. Also, some drivers can advance to become safety supervisors, driver supervisors, dispatchers, etc. Some start businesses of their own.

Earnings vary due to miles driven, hours worked, equipment driven, type and weight of load, etc. Earnings in excess of $10,000 per year are common for heavy truck drivers, but drivers of small trucks earn less. Wages in this type of driving will vary greatly from employer to employer.

Opportunities in trucking jobs are expected to continue to grow through the 1970's.

Print Out
First 40 Occupations
November 16, 1967

OCCUPATIONAL PRINT OUTS FOR COG 2

LIST OF OCCUPATIONS IN COG 2 PAGE

LIST OF OCCUPATIONS IN COG 2

AIR TRAFFIC CONTROL SPECIALIST

Air traffic controllers work for the Federal Aviation Administration. They give instructions, advice and information to pilots, by radio, in order to avoid crashes, reduce delays in landing and takeoffs, and help find and guide lost aircraft.

They must be 21 years old and have two to three years of experience in fields such as military air traffic control, piloting, flight communications, radar, or dispatching. A civil service test is also required. Those who pass are trained for eight weeks at the FAA Aeronautical Center in Oklahoma City. At work training is given at the Center where they will be working. A strict physical examination is required every year.

Working conditions are good although shift work is often required. Work is performed indoors in good surroundings that are temperature controlled. Controllers work a 40-hour week on shifts. There is mental pressure. Good eyesight is necessary.

Promotion is through steps set up by the FAA. These are determined by experience and testing. After becoming a chief controller, advancement is not regulated and may lead to top management positions.

Salaries range between $650 and $1000 per month. A chief controller may earn as much as $1370 per month or more. Although this is a stable occupation, the increase in air transportation will require more air traffic control specialists.

Print Out
Second 40 Occupations
April 22, 1968

AUTO SALESMAN

Auto salesmen sell new cars and used cars as well as trucks. The main job of the salesman is to sell cars. He may also arrange financing and insurance for the cars, may register cars and obtain licenses for his customers, and check vehicles before delivery. He should keep in contact with his customers.

Most salesmen are trained on-the-job by sales managers and experienced salesmen. A high school diploma is a necessity in most cases and the sales experience is helpful. Most salesmen must be 21 years old. The salesman spends much of his time waiting on customers in the dealer's show room or used car lot. He will normally work six days a week and many evenings, and often work more than fifty hours a week.

The earnings of salesmen vary widely, depending on individual skill and geographic area. Almost all are paid on a commission basis, although small weekly or monthly salaries may be paid. The range is from $5,000 to $10,000 a year, with some earning more.

Successful salesmen who have skill as managers may advance to sales manager or may open their own dealerships. The opportunities for salesmen are very good. There is a shortage of qualified personnel.

Print Out
Second 40 Occupations
April 22, 1968

BAKER

A skilled baker is able to carry through all the steps necessary to turn out various kinds of baked goods such as pies, cakes, breads, doughnuts, pastries, etc. by following recipies.

For this training a high school education is not required, but is preferred by most employers. Many journeymen bakers and specialized bakers start as helpers and learn their trade entirely on-the-job. The best way to learn is to attend a bakers' school or to serve an apprenticeship for several years. High school baking and Armed Forces training can be helpful.

Since bakery goods are food products, sanitary standards for bakeries usually are set by local, state and federal health departments--many states require health certificates. Small bakeries require handling of equipment and ingredients while in large plants most of the heavy work is done by machinery. Baking areas are usually hot and nearly all work is done while standing.

Skilled all around bakers are often hired as working foremen in various departments of large bakeries. Many bakers open businesses of their own .

All around bakers usually average between $2 and $4 per hour with fringe benefits. Work is usually steady.

The number of jobs available is expected to decline somewhat due to the increased use of machinery in many processes and the use of machine operators for their jobs rather than all around bakers.

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BOILERMAKER

Boilermakers are skilled workers who repair, fabricate, and assemble boilers and other pressure vessels.

Although many have become boilermakers after working as a helper for an experienced man for a number of years, the best way to learn this trade is to complete a formal apprenticeship of about four years. A high school diploma is desirable.

Boilermakers may be required to work in small places and at heights. Sometimes there may be poor heat and stale air. Boilermaking is one of the more risky steel working jobs.

Advancement to foreman, superintendent, etc. is possible.

The usual work week for boilermakers is around 40 hours and hourly rates range between $4 and $6 per hour. Boilermakers in field assembly and installation work usually get higher rates than those in industry, but their work may not be as steady.

A moderate growth in the number of positions is expected.

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BUILDING MAINTENANCE

A building custodian cares for and repairs the equipment used for heating and cooling a building, cleans rooms, disposes of trash, answers tenant complaints, maintains the building grounds, etc.

No formal schooling of any kind is required in general. If the particular job is under the civil service commission, an examination must be passed, a minimum age of 18 reached, and a high school diploma necessary. Certain advanced jobs require about 3 years of experience in journeyman status in a recognized building trade. Passing a licensing examination for stationary engineer is sometimes necessary.

A custodian's working conditions vary from white collar jobs to outside gardening, to fixing equipment in crawl spaces. He deals with people and works usually eight hour shifts with a five or six day week. The custodian is often on 24 hour call.

Chances for advancement depend upon the particular job. The larger organizations may have jobs such as supervising custodian and head custodian.

Earnings usually are hourly with the average around $1.50 per hour. Custodians for a business firm often earn more than those working in apartment buildings; however, the latter may receive living quarters as well as their pay.

As the construction of buildings continues, the number of job openings will increase. Because of the low training requirements, competition is usually high.

BUS DRIVER

A bus driver operates a bus to transport passengers over local or long distance routes according to a time schedule. He is responsible for the passengers and freight on his bus.

Minimum requirements for applicants for inter-state driving jobs are established by the Interstate Commerce Commission. These include certain physical, mental and age requirements (must be 21). You need a high school diploma and many companies have thier own training programs.

The driver is expected to see that his bus is ready for trips. Drivers for large companies work from 32 to 36 hours per week, hours of work per week, and 3 1/2 to 6 days per week. Schedules vary and you may have to work shifts and holidays.

Advancement consists of receiving better routes or shifts with better earnings and seniority, and promotion to dispatcher, supervisor, or general manager.

The average hourly rate for local drivers is about $3 per hour and inter-city drivers earn about $8,000 per year. Employment opportunities for local drivers are declining due to the increase of automobiles and the growth of modern shopping centers. Employment for inter-city drivers is expected to increase moderately due to increased travel by the general population and the reducation of passenger travel by railroad.

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BUTCHER

The butcher is a skilled craftsman who kills and prepares animal flesh, fish, fowl, etc. to eat. He kills and skins the animal and removes unwanted parts to prepare the carcass for processing. He teaches other employees in various duties and assists in processing by-products. He may also work as a meat cutter in a retail store or supermarket. He must know the quality of meat and how to make the many standard cuts.

High school graduation is usually required. A formal apprenticeship program is the best way to train. It is usually a four-year on-the-job training program with related classroom work.

Wages range from $100 to $150 per week. Butchers working in slaughter-houses earn between $2.00 and $3.50 an hour or $80 to $140 a week. Normal five day, forty hour week is common although some evening and Saturday work is possible.

Skilled butchers may, with additional training, be promoted to foreman or store manager. Some may also go into the retail meat business.

There are many jobs available. Opportunities are good.

There is a great deal of heavy lifting involved. Some time every day is spent in the cold room or a refrigerated locker room. There are some disagreeable aspects of the job, such as fresh blood and odor.

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CONCRETE FINISHER

The main job is to finish any exposed concrete surfaces on a construction project. They may range from small jobs such as patios, floors and sidewalks to work on highways and airport runways. He makes sure the forms which hold the concrete are set at the right angle and depth. He pours or directs the pouring of the concrete mixture. He levels the surface and prepares it for the final finishing operation.

A high school education is not required. A three-year apprenticeship program is recommended. However, on-the-job training is also available. The apprenticeship program consists of on-the-job training and related classroom instruction. Some mathematics is required for completion of the apprenticeship program.

Most of the work is done outdoors. The work week is generally a regular 5 day, 40-hour week, however overtime is often required because once the concrete is poured it must be completed before it hardens. The work is active and strenuous.

Union minimum hourly rates average $2.14. They range from $3.05 in Norfolk, Va. to $5.35 in Newark, N. J. Extra wages are paid for overtime work.

After becoming a journeyman he may advance to a supervisory position. He might also start his own business.

Employment outlook appears to be good until 1975. As long as construction activity continues to increase, jobs will be plentiful. Concrete can now be poured on a year-round basis.

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CRANE OPERATOR

The crane operator is a skilled worker who operates a crane to lift or move materials and perform related activities. As well as lifting and moving materials, the crane operator may grease and oil his equipment and help do various maintenance tasks and mechanical repairs.

A high school diploma is helpful. A formal on-the-job training program is required. Good physical coordination is needed.

Working conditions vary from company to company. Operators are sometimes exposed to weather extremes, but most of the time are protected by windowed enclosures.

Wages range from $2.20 an hour to $3.50 an hour according to place and type of job. Work week is a normal five day, forty hour week, with more pay for overtime.

The skilled operator may, with more training, advance to a foreman's job. Some operators may get their own equipment with financial backing, and manage a materials moving contract business.

The outlook is good, but depending on the area in which one works.

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DENTAL HYGIENIST

A dental hygienist works under the supervision of a dentist and is the only other person permitted to work in a patient's mouth. Dental hygienists are usually women. A dental hygienist charts tooth decay and disease, takes and develops x-rays, mixes filling compound, gives prescribed medications, assists in dental operations, prepares equipment, keeps records, makes appointments, etc.

A high school diploma is required. Courses should include physical and social sciences. Graduation from a two or four-year training course at an approved dental hygiene school is required. To enter government service you must have graduated from a four-year program. A state examination must also be passed to be licensed as a dental hygienist.

Dental hygienists work in clean, well-lighted offices. The work week generally ranges from 35 to 40 hours per week with some Saturday work likely. Most work is done while standing. The beginning salary ranges from $4,500 to $5,000.

Although the employment outlook is quite good, there is little chance for advancement. In order to advance in the dental profession , a dental hygienist will have to go back to dental school and become a dentist.

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DENTAL LAB TECHNICIAN

Some types of dental laboratory technicians do all types of dental laboratory work, while others specialize in making artificial dentures, crowns, bridges, and other dental appliances. The work is highly skilled.

A high school education is preferred although not necessary. Most training is received on-the-job over a period of several years in a hospital or large laboratory. Courses in dental laboratory work are offered in some public vocational schools and two-year colleges. The course work is usually taken along with on-the-job training.

A high degree of finger dexterity is required. Much of the work is done while sitting and is very demanding. Laboratories are usually clean, well-lighted and ventilated. The use of special small tools is required. Some handicapped people find this a good job.

The work week is usually 40 hours unless the technician is self-employed. Earnings average from $80 to $150 per week depending on skill and experience. Many dental laboratory technicians go into business for themselves.

Opportunities are expected to be good. Experienced well-qualified personnel are in demand over those with less experience.

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DRY CLEANER

Dry cleaners sort garments according to fabric, choose the dry cleaning process and chemicals to be used in cleaning and removing spots and stains, make the settings for the dry cleaning machines, etc. He must have a thorough knowledge of fabrics, cleaning materials and stains.

In many states dry cleaning is a licensed occupation. Preparations for examinations can be obtained through some trade schools, on-the-job experience, etc. There is no apprenticeship program, but a high school diploma is desirable. beginners usually start as a helper. At least one year of experience is required before the test.

You constantly handle all types of clothing materials and chemicals which can cause skin irritations and allergies. Work is inside, usually in a warm and humid atmosphere.

Once a person becomes a dry cleaner, there is little chance of advancement unless you work for a large firm and advance to foreman or plant manager. Many go into business for themselves.

Dry cleaning is seasonal, and employers usually reduce the hours rather than lay off employees during slow periods. Pay averages about $2 per hour with overtime.

Inexperienced workers may have difficulty finding work as new processes and equipment cut down the personnel needed. Most skilled jobs will be taken by people who have already had some experience.

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ELEVATOR REPAIRMAN

He installs and repairs elevators, escalators, dumb waiters and similar equipment. He inspects elevators and escalators. When necessary he adjusts cables, lubricates and replaces parts.

As well as inspecting and repairing elevators and similar equipment, he must understand electronics, electricity and hydraulics. He must be able to repair motors and signal systems, and operate many hand and power tools.

A high school diploma and 2 years of experience is necessary, including a 6-months on-the-job training at the factory of an elevator firm.

There is a great deal of classwork required. Most of the work is performed in cramped or awkward positions. There is some manual labor involved. The work is done indoors and there is some danger involved working in elevator shafts and with electrical equipment. Regular five day, 40-hour week is normal.

Wages vary according to the location. The range is from $2.75 to $4.50 an hour, with the average at $3.67 an hour.

Most repairmen work for small, local contractors, others work for government agencies or business establishments which do their own elevator maintenance and repair. There are opportunities to open your own business.

There are a limited number of jobs available each year. However openings will vary with local job demands.

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FIREMAN

A paid fireman is responsible for protecting the lives and loss of property from fire. His duties differ with the size and type of fire department. He may be expected to use hose lines, ladders, axes, and do salvage work. There is also equipment maintenance and fire prevention work involved in his job.

A high school diploma is usually needed. You learn from an on-the-job training program which often includes training in building construction, electricity, first aid, rescue operations, etc. Strict physical requirements must be met due to the risk of fire fighting.

Firemen usually work 56 to 73 hours per week, eat and sleep at the fire station, and are normally on duty for 24 hours, followed by 24 hours off duty with additional days off at regular intervals depending on the community.

Starting salaries generally range from $4,500 to $5,500 for beginners and after 2 to 5 years on the job salaries range from $5,000 to $6,500. Pay allowances are given for some equipment and dress uniforms are usually provided.

Advancement usually depends on the candidate's position on the promotion list which is determined by his rating on a written examination, his work as a fireman, and his seniority. A fireman can be promoted through various steps up to fire chief and do many jobs such as fire prevention, etc.

Employment outlook for the future appears good. New jobs will become available as fire departments are enlarged and new departments replace volunteer companies in many cities.

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FLOOR COVERING INSTALLER

A floor covering installer installs and repairs tile, linoleum and carpeting, in residential, commerical, and industrial buildings. These flooring materials are usually installed on wood, concrete, metal, or stone floors and may vary in size from a small kitchen to a large supermarket floor. He inspects the floor, checks its conditons, prepares the surface to be covered, and applies the covering material.

A high school education is desirable and a three to four year apprenticeship program is recommended. The trade may also be learned by on-the-job training.

All work is done indoors. The usual work week is 40 hours with some overtime required. There is a great deal of physical activity, and there is pressure to finish the work on time.

Experienced floor installers usually are paid between $3.50 and $4.50 an hour--wages range from $2.50 to $5.50 an hour depending on the location of the job.

Skilled floor installers may advance to foreman or installation manager in large floor-covering firms, and can become salesmen or estimators or go into business for themselves.

The employment outlook for the future appears to be good, depending on general business conditons.

FOUNDRY WORKER

The foundry worker performs many jobs in making molds, charging furnaces, cleaning and dressing castings, moving foundry materials, and cleaning equipment and work areas.

Most workers start as unskilled helpers and learn while working in the foundry. Workers who specialize in coremaking and patternmaking, learn their jobs through formal apprenticeships, or a combination of both high school training and on-the-job training. A high school diploma is recommended.

Working conditions vary among foundries. Some compare with other factories in safety and comfort, but others fall far below average in ventilation, temperature, and cleanliness. Heat, fumes, smoke, dust, and noise are nearly always present in foundries.

Advancement usually comes from promotion from a general or helper's job to one of the more skilled activities such as a molder or coremaker.

The average earnings for workers in the iron and steel foundries is around $3 per hour with fringe benefits.

Work is year around, and chances for employment should be good for the next ten years.

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FURNITURE UPHOLSTERER

An upholsterer installs, repairs or replaces springs, padding and covering material used in home furniture and automobiles, buses, and airplane seats.

Most upholsterers learn their skills informally, but some serve apprenticeships. A high school education is useful, but not essential. In some high schools vocational training is offered. Correspondence courses can be taken, and many firms have on-the-job training programs which are popular means of training.

Large new shops, or those operated by manufacturers are likely to be well-lighted, ventilated, and fairly quiet, but many small shops are dusty and dirty. Work is usually done inside, but may require working in awkward positions when working on cars, etc.

Skilled upholsterers who supervise may advance to foreman in large shops or start their own businesses. Upholsterers are usually on a weekly or hourly wage, earning between $110 and $175 per week,, and may also get a percentage of the sales in a custom or repair shop. The higher rates are usually paid in custom shops once the business has been established.

Employment for upholsterers is rather static. Few people have entered or are being trained to enter the field, and no expansion is expected in the near future.

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GLAZIER

Glaziers cut, grind, polish and fit glass for windows, mirrors, sky lights, automobiles, curtain walls and many other special purpose functions. He prepares the frame, installs the glass and fastens it into place with putty or mechanical fixtures.

A high school education is desirable. Many have learned the trade by working with skilled workers, but completion of an apprenticeship program is considered the best preparation.

The regular work week is eight hours per day, five days a week with few seasonal lay-offs. Wage rates usually range from $2.50 to $5.50 per hour depending on the area and type of employment.

In large companies glaziers may become foremen. Some go into business for themselves. In this case they need sales and administrative ability in order to be successful.

Employment opportunities look good through the 1970's due to the increase in various forms of building construction.

Most of the glazier's work is performed outdoors, and large plate glass panels are heavy. Good health, strength and endurance are important.

Glaziers risk the danger of falling from scaffolds, and back injuries from lifting, as well as cuts from glass and sharp tools.

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GUNSMITH

The gunsmith repairs guns or adapts them to the user's needs or he may design or build an entire weapon. He disassembles and cleans firearms and replaces worn and broken parts. He may make parts that are not available from a manufacturer, and must be able to use a lathe, drill press and other machine-tool eauipment. He may also buy, sell and trade guns, sell hunting licenses, ammunition, reloading equipment and other accessories.

A background in woodworking and machine shop is valuable for entrance into the job. Since the field is limited, entry is not easy. Job seekers should place application directly with prespective employers. Most trainees spend four to five years with a gunsmith to learn the trade. There are no formal apprentice programs, but there are courses offered by some schools, manufacturers, and correspondence schools.

The work is exacting, requiring great skill and much patience. Since most shops are quite small, they may be in a sporting goods store, or a private home. Most work is indoors and the gunsmith is on his feet much of the time.

The range is from $2.50 an hour to $3.75 an hour, although some highly skilled workers earn $4.50 to $4.75 an hour. Trainees start much lower. Hours are generally six days a week, eight hours a day.

Advancement is limited, although there are opportunities to open ones own shop and sell firearms to make a comfortable living. There is a general shortage of good men in the field.

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INDUSTRIAL VOCATIONAL TEACHER

He teaches students how to prepare for an occupation or employment. Some teachers work in day schools, evening programs, teach adults only, teach shop work, etc. He must be able to teach manual and technical skills as well as related subjects in mathematics, drawing and science.

In most states two years of college and two years of trade experience is required in the area to be taught. Teaching practice may be gained on-the-job. A trade competency test is often given before a teaching certificate can be issued.

Conditions depend mostly on the school district where the teacher is employed. They may range from clean, well-equipped classrooms and shops, to dirty, old and poorly kept classrooms. Industrial vocational teachers work the same hours that most teachers do. There may be some danger involved in working with large groups of students on complex industrial equipment.

Salary range will vary with the school district, however, starting salary may be from $4,000 to $6,000 with yearly increases on the basis of time employed.

Opportunity to advance from classroom teacher to supervisory or administrative positions is available. However, additional training and advanced degrees are usually necessary.

Outlook is generally good due to the lack of qualified people.

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INDUSTRIAL X-RAY OPERATOR

Using x-rays, he photographs metal castings, weldings, metal samples and other metal objects to detect imperfections such as cracks, pores, bubbles or other imperfections which are not visible to the naked eye. His work provides an exacting method of inspection, In addition to photographing metal objects, the industrial x-ray operator must be able to process the film, study the results, and report the findings.

A high school diploma is usually required. On-the-job training is usually given for a period of one to two years, which will permit the trainee to become an equipment operator. From three to five years are required to become a trained film analyst. Previous experience in welding is useful.

Work is done either in laboratories or on the plant floor. Portable equipment is used for outdoor work. Some work is done at heights of 50 to 100 feet. Some heavy lifting is required. There is some physical risk involved in working with x-ray equipment.

Wages range from $2.50 to $3.50 an hour. There is a great deal of Saturday and Sunday work with extra pay for this overtime.

Additional training will enable the worker to learn more skills. Some supervisory openings are available. Employment prospects are good, particularly in government-financed missle and space projects.

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INSTRUMENT REPAIRMAN

They repair, install and service the complex industrial and scientific instruments that measure, record or control heat, electricity and other objects.

They take apart broken instruments and test all the parts and wires for defects. They may do major overhauls or make minor repairs. They must be able to use assembly drawings and blueprints. They may help scientists and engineers by selecting and arranging instruments for tests and experiments.

High school graduation is required. To become a fully qualified repairman will usually take at least 4 years of on-the-job training and study. This may be obtained by taking an apprenticeship program. Training is also given in technical institutes or junior colleges; or by the Armed Forces technical schools.

Most work a five day, 40-hour week. Some shift work may be required in addition to Sunday and holiday work. They will work both indoors and outdoors. When inside they will work with a great deal of noise and much oil and grease. Some traveling may be involved.

Wages average between $3.20 and $3.50 an hour. Highly skilled repairment may earn a good deal more.

They can become group leaders or foremen in maintenance or assembly departments. They may also become service representatives. Some may become engineering assistants.

Opportunities appear very good for the future.

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LATHE OPERATOR

The lathe operator may run either a manual or automatic lathe. He sets up his machine by selecting the proper tool, speed, and depth of cuts. He watches it carefully while it is cutting and checks its accuracy and reports any machine breakdown.

Although a high school education is preferred, formal training is usually not required. Usually on-the-job training is given or a formal apprenticeship may be served.

Machine shops and production plants are usually well-lighted and ventilated, but are often noisy and dirty.

Advancement as a semi-skilled operator is limited, however, skilled operators can go on to learn the operation of additional machine tools and eventually become all around machinists, foremen, or start businesses of their own. Hourly wages usually range between $2.30 to $3.25 per hour for skilled operators with an 8-hour day, 40-hour week with overtime.

This job is available in most parts of the country and is subject to occasional layoffs. However, the number of openings is expected to grow for a period of time but due to the number of people in the occupation, openings are not always readily available.

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